

EDUCATIONAL PSYCHOLOGY

ACTIVE LEARNING EDITION

FIFTEENTH EDITION

ANITA WOOLFOLK ELLEN L. USHER

Educational Psychology

Active Learning Edition

Fifteenth Edition

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Pearson

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Library of Congress Cataloging-in-Publication Data

Educational psychology
Library of Congress Cataloging in Publication Control Number: 2023000005

ScoutAutomatedPrintCode

Pearson

ISBN 10: 0-13-812432-9
ISBN 13: 978-0-13-812432-8

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Anita Woolfolk Hoy

To my brothers, Eric and Robert Pratt—two of the smartest, kindest, most talented people I have ever known. I am grateful for their presence in my life. They are my parent's best gift to me.

Eric is a dedicated engineer, responsible for designing important parts on several airplanes. He perfected each design with a sense of personal responsibility for the well-being of everyone who would fly in those planes.

Robert is the artist who created the amazing sculpture on the cover of this book. As a friend said when she saw it, "I am struck by the beauty of the hands uplifting the child. I envision the hands of parents, grandparents, family, and teachers. My son was in kindergarten this year and had the most wonderful teacher. When I look at this sculpture, I see her hands with ours, lifting his up."

Ellen L. Usher

With gratitude to members of the P20 Motivation & Learning Lab. Our decade of thinking, laughing, and learning together enriched my understanding of what it means to teach and learn. You made my intellectual life and scholarship infinitely better.

From Both of Us:

In memory of

Albert Bandura

1925–2021

He forever changed the fields of social and clinical psychology, learning, motivation, personality, and moral reasoning.

As undergraduate and graduate students, we read his books and studies. As professors, we taught his theories. As researchers, we grounded our work on motivation, self-efficacy, and self-regulation in his research and scholarship.

We have never known an educational psychology that did not include his thinking, nor will we ever.

A lifetime of thanks to you, Professor Bandura, our professional inspiration and guide.

About the Authors

So you will know your authors a bit better, here is some information.



Anita Woolfolk Hoy was born in Fort Worth, Texas, where her mother taught child development at TCU and her father was an early worker in the computer industry. She is a Texas Longhorn—all her degrees are from the University of Texas, Austin, the last one a PhD. After graduating, she was a psychologist working with students in elementary and secondary schools in 15 counties of central Texas. She began her career in higher education as a professor of educational psychology at Rutgers University and then moved to The Ohio State University in 1994. Today she is Professor Emerita at Ohio State. Anita's research focuses on motivation and cognition, specifically, students' and teachers' sense of efficacy and teachers' beliefs about education. For many years she was the editor of *Theory Into Practice*, a journal that brings the best ideas from research to practicing educators. She is a Fellow of both the American Psychological Association and the American Educational Research Association and has served as President of Division 15 (Educational Psychology) of APA and Vice President for Division K (Teaching & Teacher Education) of AERA. Anita also has collaborated with Nancy Perry, University of British Columbia, to write the second edition of *Child Development* (Pearson, 2015) and with her husband, Wayne Hoy, to complete the fifth edition of *Instructional Leadership: A Research-Based Guide to Learning in Schools* (Pearson, 2020).



Ellen L. Usher spent her early childhood in Roswell, Georgia, where she had diverse educational experiences that included attending a private nature-based school and public elementary and middle schools. She went to high school in rural South Carolina and urban Atlanta. A lifelong Francophile, she earned her bachelor's in foreign language education and began her professional career teaching French to elementary school students in Atlanta Public Schools. Inspired by her own favorite former teachers, Ellen transitioned to teaching fifth and sixth grades while pursuing a master's degree in middle grades education from Oglethorpe University. After earning her PhD in Educational Studies from Emory University, Ellen began her career in higher education at the University of Kentucky in 2007, where she was director of the P20 Motivation and Learning Lab—an intergenerational, interdisciplinary team of researchers engaged in projects that explore human motivation in a variety of teaching and learning contexts. In 2022, she joined the Mayo Clinic College of Medicine and Science where she is an education scientist and professor. Ellen is a Fellow of the American Psychological Association and past Chair of the Motivation in Education Special Interest Group of the American Educational Research Association.

Preface

Many of you reading this book are enrolled in an educational psychology course as part of your professional preparation for teaching, counseling, speech therapy, nursing, or psychology. The material in this text should be of interest to everyone who is concerned about education and learning, from the nursery school volunteer to the instructor in a community program for adults learning English. No background in psychology or education is necessary to understand this material. It is as free of jargon and technical language as possible, and many people have worked to make this edition clear, relevant, and interesting.

The text maintains the new, unique format that was created for the previous Active Learning Edition. If you didn't see that text, this one is probably unlike any textbook you have ever encountered. It is divided into 47 easy-to-read modules. Research in educational psychology points to several reasons why this format will help you learn. First, we have known for years that learning is faster and more permanent if you study smaller chunks over a longer period instead of trying to jam more learning into your brain in a short period of time. Also, we know that learning is deeper and more meaningful if you act on what you read—connect and apply your understanding before you get too far away from the new information. Third, we know that motivation is higher when goals are specific, the task is moderately challenging, and it can be accomplished with reasonable time and effort. Fourth, more frequent testing and checking your understanding early let you correct misconceptions and relearn, so you do not remember the wrong information. Finally, we know that your lives are full, and your assignments are many, so shorter, more manageable readings fit better into your schedule. Mastering these active learning modules will help you become more self-regulating and in charge of your own academic life. So welcome to a better, more research-based way to learn educational psychology—our favorite subject!

The 15th edition of *Educational Psychology* continues to emphasize the educational implications and applications of research on child development, cognitive science, learning, motivation, teaching, and assessment in diverse contexts. Theory and practice are not separated in the text but are considered together to solve the everyday problems of teaching. To help you explore the connections between research and practice, these pages include a wealth of examples, lesson segments, case studies, guidelines, and even practical tips from experienced teachers. Our goal is to provide knowledge and skills so you can build a solid foundation for a sense of teaching efficacy in every context and for every student. As you read this book, we believe you will see the immense value and usefulness of educational psychology. The field offers unique and crucial knowledge to *any who dare to teach and to all who love to learn*. Since the last edition appeared, there have been exciting developments in the field, and they are reflected in the upcoming clusters. We have also addressed the ways in which the COVID-19 pandemic has changed educational practices and outcomes for many teachers and learners around the world.

New Content in the 15th Edition

Across the book, there is increased coverage of a number of important topics. Some of these include:

- A bold approach to face head-on the issues of **identity, race**, and **privilege** in teaching. After you explore the field of educational psychology in Cluster 1, in the next cluster, we ask you to examine yourself and your students. Who are you? Who are they? We consider **diversity in today's classrooms**. Portraits of students in

educational settings make diversity real and human. In a number of other clusters, there are new exercises asking readers to "Put Yourself in Their Place" as a way to develop empathy for many students and situations.
- Increased coverage of the **brain, neuroscience, and teaching**, emphasized in Cluster 3 and also integrated into several other clusters.
- Increased coverage of **the impact of technology and interactive learning environments** on the lives of students and teachers today.
- New sections in several clusters on **social and emotional learning (SEL)** and **trauma-informed teaching**.
- New **"What Would You Do?"** cases and new responses from teachers around the United States and Canada, including a case that asks expert teachers what they learned from the shifts to remote instruction during COVID-19 and what they will keep doing as schools get back to "normal."

Key content changes in each cluster include:

- **Cluster 1:** To help build your foundation for a sense of teaching efficacy, we have added a **new casebook about becoming a great teacher** in a world filled with online and in-person "advice." There are responses from expert teachers and even an expert student teacher. In addition, we include new information on **social and emotional learning (SEL**) and the **effects of trauma** on students—two topics that will be addressed in several other clusters. Also, the section on good teaching now includes the widely used **CLASS model**.
- **Cluster 2:** This cluster begins with a new case that could happen in any school, **"Conversations About Race."** We explore the ways that **education is cultural** and then ask you to examine **your own educational and cultural history**—Who are you? What brought you here? To help you think through these important questions, there is new coverage of **intersectionality, stereotypes, prejudice, and poverty** as well as expanded coverage of **racial and gender identity, sexual orientation**, and **creating inclusive classrooms**.
- **Cluster 3:** New information on the **brain, synaptic plasticity**, and **implications for teaching**. Also, there is greater **critical analysis** of Piaget's and Vygotsky's theories.
- **Cluster 4:** Updated information on **early and late maturation in puberty, play, childhood obesity, disordered eating, culture and parenting, aggression, social and emotional learning, child abuse and mandated reporting, identity and technology**, and **dealing with cheating**.
- **Cluster 5:** New sections on **terms and labeling, multiple intelligences, emotional intelligence, problems with learning styles, ADHD, trauma-informed teaching, seizure disorders** and other serious health concerns, and **autism spectrum disorders**.
- **Cluster 6:** New information on **language diversity, Native American languages**, and **an expanded section on affective and emotional/social** considerations for immigrant student and language learners, including **dealing with trauma**.
- **Cluster 7:** Expanded coverage of the **neuroscience** of reinforcement and punishment, **effective instruction delivery, cautions in using time out** for parents and teachers, **reasons** for problem behaviors, and using **positive behavior supports for tiers 1, 2, and 3 prevention** of problems.
- **Cluster 8:** Updated coverage of the **brain and cognitive learning, multitasking, working memory and cognitive load, concept teaching, effective practice**, and **teaching implications** of cognitive learning theories. In addition, there is a new section on **children and eye-witness memory**, including **guidelines** for interviewing students.
- **Cluster 9:** New sections on how teachers can **support student metacognition**, using **visual strategies and drawing** to learn, **worked examples and embodied cognition, deliberate practice, thinking critically about online sources**, and **integrating**

multiple sources of information. Updated coverage of **problem solving and argumentation**.

- **Cluster 10:** A new casebook asking about **new approaches to teaching and learning that emerged during COVID-19** to facilitate meaningful learning through remote and hybrid instruction. Updated discussion of the **elements of constructivist** learning and teaching, **scaffolding, deep questioning, collaboration, learning in a digital world, immersive learning environments, blending and flipping classrooms**, and **computational thinking**. New sections on **constructive/structured controversy, mobile learning**, and **media citizenship**.
- **Cluster 11:** Updated coverage of **social cognitive theory, self-efficacy and agency, teacher self-efficacy, self-regulated learning, grit**, and **teacher stress**. New sections on **self-regulation of emotions** as relevant for both teachers and learners.
- **Cluster 12:** Cluster is reorganized around **motivational components (e.g., needs, values, goals, beliefs)** and the **antecedents** and **outcomes** associated with them. Updated treatment of **intrinsic and extrinsic motivation, self-determination, goals, school belonging, mindsets**, and **curiosity**. New sections on **social goals** and **achievement emotions**. Completely revised section on **strategies** to encourage **motivation to learn**.
- **Cluster 13:** Cutting across this cluster is the challenge of creating supportive in-person and remote learning environments. **New** sections on rules and routines for **managing remote learning** including a **"Welcome to Remote Learning" letter** to students from an expert teacher (Anita's daughter). Updated and expanded material on **positive teacher connections, zero tolerance, bullying and cyberbullying, restorative justice**, and **culturally responsive classroom management**.
- **Cluster 14:** Updated research on **teacher expectations, differentiated teaching**, and **homework**, as well as new sections on **ambitious teaching, Webb's Depth of Knowledge, asking essential and authentic questions**, and **giving feedback**. There also are new sections on **Quality Talk** and **Universal Design for Learning**.
- **Cluster 15:** New sections on **feedback** and **teacher evaluation**. Updated material on **selected-response testing, scoring rubrics, grading, retention in grade**, and **value-added modeling**.

A Crystal Clear Picture of the Field and Where It Is Headed

The 15th edition maintains our renowned lucid writing style presenting accurate, up-to-date coverage of the foundational areas within educational psychology: learning, development, motivation, teaching, and assessment. We add intelligent examinations of emerging trends in the field and society that affect student learning, such as student diversity, inclusive teaching, social and emotional learning, education and neuroscience, and technology.

Learning Management System (LMS)-Compatible Assessment Bank, and Other Instructor Resources

LMS-COMPATIBLE ASSESSMENT BANK With this new edition, all assessment types—quizzes, application exercises, and licensure exam practice—are included in LMS-compatible banks for the following learning management systems: Blackboard, Canvas, D2L, and Moodle. These packaged files allow maximum flexibility to instructors when it comes to importing, assigning, and grading. Assessment types include:

- **Learning Outcome Quizzes:** Each cluster learning outcome is the focus of a Learning Outcome Quiz that is available for instructors to assign through their learning management system. Learning outcomes identify cluster content that is most important for learners and serve as the organizational framework for each cluster. The higher-order, multiple-choice questions in each quiz will measure your understanding of cluster content, guide the expectations for your learning, and inform the accountability and the applications of your new knowledge. Each multiple-choice question includes feedback for the correct answer and for each distractor to help guide students' learning.
- **Application Exercises:** Each cluster provides opportunities for students to apply what they have learned through *Application Exercises*. One *Application Exercise* is available for each Learning Outcome within the cluster. The exercises require students to watch short videos, read scenarios, or think about situations and then answer open-ended questions. When used in the LMS environment, a model response written by experts is provided after students submit the exercise. This feedback helps guide students' learning and can assist the instructor in grading.
- **Cluster Tests:** Suggested test items are provided for each cluster and include questions in multiple-choice and short-answer/essay formats. Some items (lower-level questions) simply ask students to identify or explain concepts and principles they have learned. But many others (higher-level questions) ask students to apply those same concepts and principles to specific classroom situations—that is, to actual student behaviors and teaching strategies. The lower-level questions assess basic knowledge of educational psychology. But ultimately, it is the higher-level questions that can best assess students' ability to use principles of educational psychology in their own teaching practice.

Additional Text Features

With an unswerving emphasis on educational psychology's practical relevance for teachers and students in classrooms, the text is filled with current issues and debates, examples, lesson segments, case studies, and practical ideas from experienced teachers.

Point/Counterpoint sections in each cluster present two perspectives on a controversial question related to the field; topics include debates on the kinds of research that should guide education (p. 25), should girls and boys be taught differently? (pp. 70–71), brain-based education (pp. 98–99), the self-esteem movement (pp. 168–169), pills or skills for students with ADHD (pp. 220–221), the best way to teach English learners (pp. 270–271), using rewards to encourage student learning (pp. 322–323), what's wrong with multitasking? (pp. 337–338), teaching critical thinking and problem solving (p. 405), problem-based education (pp. 434–435), are "grittier" students more successful? (pp. 488–489), the value of trying to make learning entertaining (p. 537), zero tolerance (pp. 585–586), the value of homework (pp. 629–630), and holding children back (pp. 676–677).

Guidelines appear throughout each cluster, providing concrete applications of theories or principles discussed. See, for example, pages 55, 69, 80, 110, 113, 126, 135, 141, 147, 152, 164, 196, 205, 225, 230, 255, 262, 278, 295, 304, 307, 313, 339, 355, 366, 398, 400, 430, 449, 459, 476, 481, 495, 517, 533, 538, 544, 564, 567, 571, 575, 580, 584, 593, 614, 621, 626, 636, 640, 661, 671, 678, and 691.

Guidelines: Family and Community Partnerships sections offer specific guidelines for involving all families in their children's learning—especially relevant now, when demand for parental involvement is at an all-time high and the need for cooperation between home and school is critical. See, for example, pages 108, 146, 211, 280, 319, 360, 411, 551, 600, 630, and 687.

Teachers' Casebook sections present students with realistic classroom scenarios at the beginning of each cluster and ask "What Would You Do?"—giving students the opportunity to apply all the important topics of the Cluster to these scenarios via application questions. Students may then compare their responses to those of veteran teachers appearing at the end of each cluster. See, for example, pages 83, 181, 285, 463, 504, 553, and 603.

Reaching Every Student sections present ideas for assessing, teaching, and motivating ALL of the students in today's inclusive classrooms. See, for example, page 152.

Lessons for Teachers are succinct and usable principles for teaching based on the research. See, for example, page 101.

Put Yourself in Their Place experiences develop empathy by asking students to imagine how they would feel in different situations. See pages 62, 103, 255, 274, and 594.

Stop and Think activities give students firsthand experience with the concept being discussed, as on pages 15, 39, 42, 162, 168, 308, 390, 451, 522, and 559.

Supplementary Materials

Many supplements to the textbook are available to enhance readers' learning and development as teachers.

INSTRUCTOR'S MANUAL The Instructor's Manual is provided as a Word document and includes resources to assist professors in planning their course. These resources consist of suggestions for learning activities, supplementary lectures, group activities, and additional media resources. These have been carefully selected to provide opportunities to support, enrich, and expand on what students read in the textbook.

POWERPOINT® SLIDES PowerPoint®slides are provided for each cluster and highlight key concepts and summarize the content of the text to make it more meaningful for students. Often these slides also include questions and problems designed to stimulate discussion and to encourage students to elaborate and deepen their understanding of cluster topics.

Note: All instructor resources—LMS-compatible assessment bank, instructor's manual, and PowerPoint slides—are available for download at http://www.pearsonhighered.com.

Acknowledgments

From the initial draft of this book to this most recent revision, many people have supported the project. Without their help, this text simply could not have been written.

Many educators contributed to this project. Nancy Perry, our colleague from the University of British Columbia, contributed to the early planning for this edition and the redesign of several *Teachers' Casebook* questions; recruited and collaborated with Canadian teachers for the *Casebooks*; worked with her student Silvia Mazabel to research Clusters 3, 4, and 5; and drafted the first several sections of Cluster 4. Nancy's keen eye and deep knowledge of the field made this edition more current and inclusive. In addition to working with Nancy, Silvia expertly completed research for multiple clusters, kept a sharp eye on the final versions of those clusters, and ensured that the references in the clusters and the final bibliography were accurate.

In previous editions, before she became a coauthor, Ellen L. Usher contributed her remarkable scholarship and delightful writing to revise Clusters 2 and 11. Carol Weinstein wrote the section in Cluster 13 on spaces for learning. Michael Yough (Oklahoma State University) reviewed several clusters, including Cluster 6, "Language Development, Language Diversity, and Immigrant Education." Cluster 6 was also improved by suggestions from Alan Hirvela, The Ohio State University. Jerrell Cassady, Ball State University, provided invaluable guidance for Cluster 12, "Motivation in Learning and Teaching." The portraits of students in Clusters 1, 2, and 6 were crafted by Nancy Knapp (University of Georgia).

As we made decisions about how to revise this edition, we benefited from the ideas of colleagues around the country who took the time to complete surveys, answer our questions, and review clusters. Special thanks to Krystal Lira, Kimberly Alberts, and Alexandra Lee (Michigan State University) and Tony Perez and Arianna White-Levatich (Old Dominion University) for their input on content, structure, and flow for the 15th edition. We thank Jennifer Burris, Anastacia Cole, Candice Hargons, Sara Kuhl, and Jaylene Patterson (University of Kentucky) and Xiao-Yin Chen (University of Georgia) for their insightful input on specific sections related to privilege and diversity. And once again, we are grateful for the astute comments and wise guidance on those topics from H. Richard Milner, a groundbreaking scholar and friend.

For their revision reviews, thanks to Alyssa Gonzalez-DeHass, Florida Atlantic University; Carla M. Firetto, Arizona State University; Judy K. Hughey, Kansas State University; Kurt Kowalski, California State University San Bernardino; and Marie K. Iding, University of Hawaii.

Many classroom teachers across the country and around the world contributed their experience, creativity, and expertise to the *Teachers' Casebook.* We have thoroughly enjoyed our association with these master teachers, and we are grateful for the perspective they brought to the book:

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On this edition, we worked with an outstanding editorial group. Their intelligence, creativity, sound judgment, style, and enduring commitment to quality can be seen on every page of this text. Rebecca Fox-Gieg and Brooke Nethers, Content Analysts in Teacher Education, guided the project from reviews to completion. Their patience, persistence, and expertise made all the difference. Alicia Reilly was the outstanding developmental editor with the perfect combination of vast knowledge, organizational ability, and creative thinking. The text features, embedded videos, and excellent pedagogical supports would not exist without her tireless efforts. Karin Kipp focused her keen copyeditor's eye on the manuscript. Janelle Rogers kept all aspects of the project moving forward with amazing skill, grace, artistic vision, and good humor. Ajay Prasanna V was the senior production project manager. His attention to detail, keen eye, and instant answers to questions were remarkable. Somehow these wonderful colleagues brought sanity to what could have been chaos and fun to what might have been drudgery. What a talented and creative group—we are honored to work with them all.

Finally, I (Anita) want to thank my family and friends for their kindness and support during the long days and nights that I worked on this book. To my family, Bob, Eric, Suzie, Lizzie, Wayne K., Marie, Kelly, and the newest member, Amaya—you are amazing.

And, of course, to Wayne Hoy, my friend, colleague, inspiration, passion, husband—you are simply the best.

I (Ellen) would like to thank Anita for inviting me to collaborate on this book. I have so much appreciation for the energy and time that such an effort requires. You are a kind and patient collaborator. Thanks also to members of the Kentucky P20 Motivation & Learning Lab, including two exceptional undergraduate students—Licia Henneberg and Olivia Huffman—who offered extensive help with literature recommendations, searches, and reference keeping.

—ANITA WOOLFOLK HOY AND ELLEN L. USHER

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Cluster 1

Learning, Teaching, and Educational Psychology



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Teachers' Casebook:

Becoming a Great Teacher

What Would You Do?

You are committed to being a great teacher, but teaching is a huge job. Fortunately, you're not alone. Every day, educators and researchers from around the globe post new guides and ideas for effective instruction. You enjoy using social media, online resources, and popular books to improve your teaching. You're drawn to the wisdom of those who are obviously great teachers. You bookmark these resources for activity ideas, innovative approaches, and tips for reaching your ever-changing student population. Also, you just feel that staying current in your professional knowledge is important. On occasion, the advice you hear challenges your long-held beliefs about teaching and learning. But it sometimes feels overwhelming or contradictory.

Critical Thinking

- What makes someone a great teacher? How are "best" practices determined?
- How do you evaluate the quality of others' advice about teaching and learning?
- What would lead you to conclude that someone else's advice is simply a trend versus a sound educational practice?
- What kinds of research findings would convince you to change your practice?

Overview and Objectives

Like many students, you may begin this course with a mixture of anticipation and wariness. Perhaps you are required to take educational psychology as part of a program in teacher education, speech therapy, nursing, or counseling. You might have chosen this class as an elective. Whatever your reason for enrolling, you probably have questions about teaching, schools, students—or even about yourself—that you hope this course could answer. We have written the 15th edition of *Educational Psychology* with questions such as these in mind.

In this first cluster, we begin with the state of education in today's world. Teachers have been both criticized as ineffective and lauded as the best hope for young people. Do teachers make a difference in students' learning? What characterizes good teaching—how do truly effective teachers think and act? What do they believe about students, learning, and themselves? When you are aware of the challenges and possibilities of teaching and learning today, you can appreciate the contributions of educational psychology.

After a brief introduction to the world of the teacher, we turn to a discussion of educational psychology itself. How can principles identified by educational psychologists benefit teachers, therapists, parents, and others who are interested in teaching and learning? What exactly is the content of educational psychology, and where does this information come from? Finally, we consider an overview of a model that organizes research in educational psychology to identify the key student and school factors related to student learning (J. Lee & Shute, 2010). Our goal is for you to become a confident and competent beginning teacher so that by the time you have completed this cluster, you should be able to:

1.1 Describe the challenges facing teachers today, including increasing student diversity, requirements of the Every Student Succeeds Act, the continuing impacts of testing and accountability for teachers and students, and the emphasis on social and emotional learning.

1.2 Discuss the essential features of effective teaching, including different frameworks describing what good teachers do.

1.3 Describe the methods used to conduct research in the field of educational psychology and the kinds of questions each method can address.

1.4 Recognize how theories and research in development and learning are related to educational practice.

OUTLINE

Teachers' Casebook—Becoming a Great Teacher: What Would You Do?
Overview and Objectives

MODULE 1: Educational Psychology for Today's Teachers
Learning and Teaching Today
- Inside Three Classrooms
- Students Today: Dramatic Diversity and Remarkable Technology
- Confidence in Every Context
- High Expectations for Teachers and Students
- Teaching the Whole Child: Social and Emotional Learning
- Do Teachers Make a Difference?

What Is Good Teaching?
- Models of Good Teaching
- Beginning Teachers

MODULE 2: Research and Theory in Educational Psychology
The Role of Educational Psychology
- Educational Psychology Today
- Is It Just Common Sense?
- Using Research to Understand and Improve Learning
- Theories for Teaching
- Supporting Student Learning

Cluster 1 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Becoming a Great Teacher: What Would They Do?

MODULE 1 Educational Psychology for Today's Teachers

Learning Objective 1.1 Describe the challenges facing teachers today, including increasing student diversity, requirements of the Every Student Succeeds Act, the continuing impacts of testing and accountability for teachers and students, and the emphasis on social and emotional learning.

Learning Objective 1.2 Discuss the essential features of effective teaching, including different frameworks describing what good teachers do.

Learning and Teaching Today

For the first 14 editions of this book, I (Anita) focused on traditional, in-person teaching. In several clusters of this 15th edition, we will be making a distinction between in-person learning and remote learning. If you were involved with schools in any way in 2020 and 2021 as a student, sibling, teacher, parent, or family member, then you know why we will be making this distinction. Most teachers and students had to quickly learn how to "Zoom," assuming their technologies allowed remote learning. Classes were converted to hybrid, online, or other versions to protect everyone from the spread of COVID-19. But you might be surprised to know that hybrid learning (in-person meetings combined with remote online teaching) and completely online learning were increasing even before schools had to close because of the pandemic (Pulham & Graham, 2018). Before the pandemic, Ted Cross and Laura Polk (2018) claimed that "online education is an integral part of the 21st century" (p. 1). So we will be looking at research on both in-person and online teaching and learning strategies in many clusters. Expanding your knowledge and skills to include remote

learning will prepare you for whatever the future throws at you, which brings us to our favorite topic. We invite you to join us.

Welcome to our favorite topic: educational psychology—the study of development, learning, motivation, teaching, and assessment in and out of schools. We believe this is one of the most important courses you will take to prepare for your future as an educator in the classroom or the consulting office, whether your "students" are children or adults learning how to read or individuals discovering how to improve their diets. In fact, some evidence shows that new teachers who have coursework in development and learning are twice as likely to stay in teaching (National Commission on Teaching and America's Future, 2003). This may be a required course for you, so let us make the case for educational psychology, first by stepping into classrooms today.

Inside Three Classrooms

To begin our examination of good teaching, let's step inside the classrooms of three outstanding teachers. The three situations are real. Our colleague Carol Weinstein worked with the first two teachers (Weinstein & Romano, 2015). The third teacher became an expert at helping students with disabilities master specific learning strategies.

A MULTILINGUAL FIRST GRADE. Most of the 25 students in Viviana's class have recently emigrated from the Dominican Republic; the rest come from Nicaragua, Mexico, Puerto Rico, and Honduras. Even though the children speak little or no English when they begin school, by the time they leave in June, Viviana will have helped them master the normal first-grade curriculum for their district. She accomplishes this by teaching in Spanish early in the year to aid understanding and then gradually introducing English as the students are ready. Viviana does not want her students segregated or labeled as disadvantaged. She encourages them to take pride in their Spanish-speaking heritage and uses every available opportunity to support their developing English proficiency.

Both Viviana's expectations for her students and her commitment to them are high. She has an optimism that reveals her dedication: "I always hope that there's somebody out there that I will reach and that I'll make a difference" (Weinstein & Romano, 2015, p. 15). For Viviana, teaching is not just a job; it is a way of life.

A SUBURBAN FIFTH GRADE. Ken teaches fifth grade in a suburban school in central New Jersey. Students in the class represent a range of racial, ethnic, family income, and language backgrounds. Ken emphasizes "process writing." His students complete first drafts, discuss them with others in the class, revise, edit, and "publish" their work. The students also keep daily journals and often use them to share personal concerns with Ken. They tell him of problems at home, fights, and fears; he always takes the time to respond in writing. Ken also uses technology to connect lessons to real life. Students learn about ocean ecosystems by using a special interactive software program. For social studies, the class plays two simulation games that focus on history. One is about coming of age in Native American cultures, and the other focuses on the colonization of America.

Throughout the year, Ken is very interested in the social and emotional development of his students; he wants them to learn about responsibility and fairness as well as science and social studies. This concern is evident in the way he develops his class rules at the beginning of the year. Rather than specifying do's and don'ts, Ken and his students devise a "Bill of Rights" for the class, describing the rights of the students. These rights cover most of the situations that might need a "rule."

TEACHING MATH TO STUDENTS WITH LEARNING DISABILITIES. The eighth-grade pre-algebra class had 11 students with disabilities—nine with learning disabilities. While her co-teacher taught the math lesson, Joan Hamilton provided explicit instruction in learning strategies. For example, as the math teacher explained a problem, Joan drew a circle on the overhead projector, with the example problem in the middle, and then made notes on the outside of the circle about the steps to solve the problem. Students created their own graphic organizers following Joan's lead. The next day during the homework discussion, students

returned to their circle graphic organizers to review and ask questions. The teachers retaught the steps of solving the problem as needed. Most of the students "made it through the material and on to algebra with a basic understanding of the concepts and of how to structure their notes and ask questions" (Hallahan et al., 2019, p. 130).

What do you see in these three classrooms? The teachers are confident and committed to their students. They must deal with a wide range of student characteristics: different languages, different home situations, and different abilities and learning challenges. They must adapt instruction and assessment to students' needs and teach their students "how to learn." They must make the most abstract concepts, such as ecosystems, real and understandable for their particular students. The whole time these experts are navigating through the academic material, they also are taking care of the emotional needs of their students, propping up sagging self-esteem, and encouraging responsibility. If we followed these teachers from the first day of class, we would see that they carefully plan and teach the basic procedures for living and learning in their classes. They can efficiently collect and correct homework, regroup students, give directions, distribute materials, and deal with disruptions—and do all of this while also making a mental note to find out why one of their students is so tired. Finally, they are **reflective**—they constantly think back over situations to analyze what they did and why and to consider how they might improve learning for their students. And what about those students in classrooms today?

Reflective

Thoughtful and inventive. Reflective teachers think back over situations to analyze what they did and why and to consider how they might improve learning for their students.

Students Today: Dramatic Diversity and Remarkable Technology

Who are the students in American classrooms today? Here are a few statistics about the United States.

- About 25% of U.S. children under 18 have at least one immigrant parent, but in some states such as California, the number is closer to 50% (Urban Institute, 2019). By 2045, half of the U.S. population will be members of some minority group, with about 25% being Hispanic (Frey, 2018).
- Almost 15 million children—about 21% of all children—live in poverty, defined in 2020 by the U.S. Department of Health and Human Services as an income of $26,200 for a family of four ($32,750 in Alaska and $30,130 in Hawaii). And in the public schools, just over half the students qualify for free or reduced-cost lunches—a rough indicator of poverty (Child Trends Databank, 2019). The United States has the *seventh-highest* rate of child poverty among the 41 economically advantaged countries of the world; only Spain, Mexico, Bulgaria, Turkey, Israel, and Romania are worse. Iceland and the Scandinavian countries have the lowest rates of child poverty (Blazier, 2017).
- The poverty rate for Black and American Indian children in the United States is about 30%, while the rate for Hispanic children is about 24% (Children's Defense Fund, 2020a).
- About 18% of American children have a mild to severe developmental disability such as speech and language impairments, intellectual disabilities, cerebral palsy, or autism. This number has been increasing since the early 2000s. More than half of these children spend most of their time in general education classes (Zablotsky et al., 2019).
- In 2018, for children ages birth to 17, 23% had parents who were divorced or separated, 8% were living with someone who had an alcohol or a drug problem, 7% had a parent who had served time in jail, and 7% lived with someone with a mental illness (Children's Defense Fund, 2020b).

It is clear that American society and schools are more diverse than ever. In contrast, because of the effects of mass media, these diverse students share many similarities today, particularly the fact that most are far more technologically literate than their teachers. For example:

- In 2017, infants to eight-year-olds spent an average of a little more than 2 hours each day with screen media, particularly mobile devices (Rideout, 2017). For 9- to 12-year-olds,

screen time outside school jumped to almost 5 hours, and for teens their average time is an amazing 7-plus hours. Smartphone ownership is up dramatically, as you probably know. In 2019, 19% of eight-year-olds owned smartphones. By age 18, that number was 91%, with ownership more than 80% from age 14 on (Common Sense Media, 2019). Today the numbers probably have increased.

These statistics are dramatic but a bit impersonal. As a teacher, counselor, recreational worker, speech therapist, or family member, you will encounter real children. In this book, you will meet many individuals such as Josué, a bright first-grader whose first language is Spanish and who is struggling to care about learning to read in a language that offers only "run, Spot, run"; Alex, an 11-year-old who has created 10 languages and 30 or 40 alphabets; Jamie Foxx, a very bright third-grade student in a small Texas town whose teacher rewards him for working hard all week by letting him do stand-up comedy for the class on Fridays; Tracy, a failing high school student who does not understand why her study strategies are not working for her; Felipe, a fifth-grade boy from a Spanish-speaking family who is working to learn school subjects and make friends in a language that is new to him; Ternice, an outspoken Black girl in an urban middle school who is hiding her giftedness; Trevor, a second-grade student who has trouble with the meaning of *symbol*; Maya, the head of a popular clique and tormentor of the outcast Jasmine; Eliot, a bright sixth-grade student with severe learning disabilities; and Jessie, a student in a rural high school who just doesn't seem to care about her sinking grade-point average or school in general. If your students are from low-income families, it is likely that their learning suffered more than that of students from higher-income families in the wake of the COVID pandemic. These students from less advantaged backgrounds might have more catching up to do, but it all depends on these individuals and their specific experiences (Kuhfeld et al., 2020).

Even though students in classrooms are increasingly diverse in race, ethnicity, language, and economic level, teachers are much less diverse—the percentage of White teachers is increasing (now about 80%), while the percentage of Black teachers is falling, down to about 7%. Clearly, all teachers should know and be able to work effectively with all their students. Several clusters in this book are devoted to understanding these diverse students. In addition, many times within each cluster, we will explore student diversity and inclusion through research, cases, and practical applications.

Confidence in Every Context

Schools are about teaching and learning; all other activities are secondary. But teaching and learning in the contexts just described can be challenging for both teachers and students. This book is about understanding the complex processes of development, learning, motivation, teaching, and assessment so that you can become a capable and confident teacher.

Throughout this text, we—Anita Woolfolk and Ellen Usher—will share our professional and personal experiences. We see this book as an ongoing conversation with you. To learn more about us, see the "About Your Authors" section on page v. Here is the first example of many more shared experiences, this time from Anita:

Teachers' sense of efficacy
Teachers' beliefs about how capable they are of reaching even the most difficult students and helping them learn.

Much of my own research has focused on **teachers' sense of efficacy**, defined as a teacher's belief that he or she can reach even difficult students to help them learn. This confident belief appears to be one of the few personal characteristics of teachers that predict student achievement (Çakıroğlu et al., 2012; Klassen & Tze, 2014; Woolfolk Hoy, in press; Zee & Kooman, 2016). Teachers with a high sense of efficacy work harder and persist longer even when students are difficult to teach, in part because these teachers believe in themselves and in their students. Also, they are less likely to experience burnout and more likely to be satisfied with their jobs (Fernet et al., 2012; Fives et al., 2007; Klassen & Chiu, 2010). If you would like to take the teacher self-efficacy survey that I developed, go to my website for the measure and scoring instructions (https://u.osu.edu/hoy.17/research/instruments/#Sense).

I have found that prospective teachers tend to increase in their personal sense of efficacy as a consequence of completing student teaching. But sense of efficacy may decline after the first year as a teacher, perhaps because the support that was provided during student teaching is gone (Taylor et al., 2019; Woolfolk Hoy & Burke-Spero, 2005). Teachers' sense of efficacy is

higher in schools where the other teachers and administrators have high expectations for students and the teachers receive help from their principals in solving instructional and management problems (Capa, 2005). Efficacy grows from real success with students, not just from the cheerleading of professors and colleagues. Any experience or training that helps you succeed in the day-to-day tasks of teaching will give you a foundation for developing a sense of efficacy in your career. This book was written to provide the knowledge and skills that form a solid foundation for an authentic sense of efficacy in teaching.

High Expectations for Teachers and Students

Teachers and students are affected by the expectations and requirements of their school districts, which are themselves influenced by state and national education policies. For example, in 2002, the No Child Left Behind (NCLB) Act became a federal law. NCLB required that *all students* reach proficiency by the end of the 2013–2014 school year, based on standardized test scores. You probably noticed—that did not happen.

For a while, NCLB dominated education. Testing expanded. Schools and teachers were penalized if they did not perform. Federal money could be taken away, teachers and principals could be fired, and schools could be converted to charter schools or closed. As you can imagine or may have experienced yourself, such high-stakes penalties pushed teachers and schools to "teach to the test" or worse. The curriculum narrowed, and much time was spent on drill and practice—many teachers we worked with said teaching just wasn't fun anymore (Davidson et al., 2015; Meens & Howe, 2015; Strauss, 2015). All in all, NCLB requirements were widely criticized as "blunt instruments, generating inaccurate performance results, perverse incentives, and unintended negative consequences" (Hopkins et al., 2013, p. 101). In general, math achievement did increase with NCLB, but over time student engagement declined—and student engagement is a powerful link to learning. Students can't learn what they ignore (Markowitz, 2018).

In 2015, NCLB was replaced with the Every Student Succeeds Act (ESSA). ESSA dropped the requirement for proficiency for all students by a certain date and returned most control to the states to set standards and develop interventions. For example, schools must test the same subjects in the same grades, as specified in NCLB, and at least 95% of students must participate in the testing. But the local districts now can decide when to test, whether to break one big test into several smaller tests, and even how to find better tests that really capture important student learning. At least one additional measure of school quality such as school climate and safety or student engagement must be included, along with measures of progress toward English language proficiency for English learners (Korte, 2015).

Even after ESSA, many excellent teachers still believe they are spending too much time preparing for tests and not enough time supporting student learning in subjects not tested, such as social studies, art, music, physical education, and technology (Cusick, 2014). Which leads to another high expectation for today's teachers—teaching the whole child.

Teaching the Whole Child: Social and Emotional Learning

Social and emotional learning (SEL)

The process of integrating thinking, emotion, and behavior into teaching and learning so that adults and children develop skills to be aware of themselves and others, learn to manage their own and others' emotions and behavior, make responsible decisions, and build positive relationships.

In the preceding paragraphs, you may have noticed an interest in non-academic outcomes such as school climate or student engagement and worries about subjects left behind such as art, music, or physical education. These concerns are consistent with a larger emphasis on **social and emotional learning (SEL)** and teaching the whole child, concerns shared by Viviana, Ken, and Joan, the expert teachers we described earlier. Social and emotional learning is:

> the process of integrating cognition, emotion, and behavior into teaching and learning such that adults and children build self- and social awareness skills, learn to manage their own and others' emotions and behavior, make responsible decisions, and build positive relationships… (Brackett et al., 2019, p. 144).

Social and emotional learning gained attention in 1994 when a group of educators, researchers, and psychologists formed the Collaborative for Academic, Social, and Emotional Learning (CASEL). Their mission is to be "a trusted source for knowledge about high-quality, evidence-based social and emotional learning" and to encourage schools "to educate the whole child, equipping students for success in school and in life" (CASEL, 2020; http://casel.org). Since the founding of CASEL, interest in SEL has grown. Programs and interventions for schools and classrooms have expanded—see the CASEL website for many excellent examples (http://casel.org). Today, many psychologists believe schools can promote students' mental health and academic learning by incorporating these SEL programs and practices (Schonert-Reichl, 2019). In fact, *Educational Psychologist*, a premier journal in our field, devoted an entire issue to this topic in 2019, with articles on theory, research, school interventions, assessment, teaching practices, social justice, and neurobiology (Wentzel, 2019). Does SEL make a difference?

RESEARCH ON SOCIAL AND EMOTIONAL LEARNING. There is good evidence that SEL can have positive effects on students' academic achievement and social behaviors (Hart et al., 2020). For example, Rebecca Taylor and her colleagues (2017) published a **meta-analysis** (an integration and summary of many individual studies) on the effects of 82 different SEL programs involving 97,000 students from kindergarten through high school. Students were followed from at least six months and up to 18 years after the programs ended. The results of the meta-analysis were impressive. In the eight studies that measured academic achievement, 3.5 years after the programs ended, the average achievement of students in SEL programs was 13 percentile points higher than that of students in the control groups. (We explain percentiles in Cluster 15, but for now, let's just say this is pretty good.) In other studies, students in SEL programs had lasting decreases in behavior problems, less emotional distress, less drug use, and increases in high school and college graduation rates. In a more recent review of research, Stephanie Jones and her colleagues (2019) concluded that individual SEL interventions show the largest gains for students with the greatest number of risks and needs. When what is measured in the studies is closely matched to the goals of the program, effects are more positive as well. By the way, this matching principle is important in many areas of teaching. School achievement tests and classroom tests should measure the learning goals and objectives taught. Don't teach one thing and test another.

Meta-analysis
An integration and summary of many individual studies to synthesize the outcomes into one result that characterizes the findings from the studies.

Upcoming clusters in this book will describe how social and emotional learning is related to the brain, cognitive development and learning, social development, motivation, and teaching. For now, let's consider one example of SEL in action.

PATHS: AN APPROACH TO SOCIAL AND EMOTIONAL LEARNING. SEL interventions can be as small as *kernels,* strategies that teach one skill, such as deep breathing to manage anger; larger *classroom practices* and *kits* that teach many skills, such as PATHS (Promoting Alternative THinking Strategies); or even more extensive, *whole-school programs* that engage students, parents, teachers, and administrators, such as RULER, which stands for Recognizing, Understanding, Labeling, Expressing, and Regulating emotions (Brackett et al., 2019; Jones et al., 2017, 2019). Let's consider middle-level curriculum interventions, with PATHS as an example, because these are interventions you could encounter as a teacher. The PATHS curriculum is used in more than 3,000 kindergarten through sixth-grade classrooms in the United States and another 500 around the world (Domitrovich et al., 2019).

The goal of PATHS is to develop students' social and emotional skills in self-control and emotional regulation, attention, communication, and problem solving. The curriculum has modules for pre-K through grade 5. Each module includes teaching resources such as a curriculum manual, instructor's manual, posters and other visual aids (charts, stickers, cards, etc.), puppets for young children, novels for older children, and family communication materials (https://pathsprogram.com/overview).

Let's look inside the curriculum for grade 5. One component is centered around four novels: *Bridge to Terabithia* by Katherine Paterson, *Maniac Magee* by Jerry Spinelli, *Number the*

Stars by Lois Lowry, and *Hatchet* by Gary Paulsen. In the lesson on the first three chapters of *Maniac Magee*, the students read the chapters aloud and then discuss such questions as "Why was Amanda Beale suspicious of Jeffrey Magee?" (Amanda's family is Black, and Jeffrey is White, so maybe he is not from her part of town. Jeffrey wants to borrow one of Amanda's dearest possessions, a book. Will he return it?) Students might talk about inequality, racism, trust, sharing, or empathy. After the lesson, students may journal and then share their ideas about such topics as "Amanda kept her books in a suitcase to protect them—they were her most important possessions. What would you put into a suitcase—what are your most important possessions? Why?" Other lesson follow-ups might introduce the idea of character analysis, so the PATHS curriculum supports academic goals as well (https://pathsprogram.com/grade-5). Explore the PATHS website for more information.

As you will see in future clusters, some applications of SEL have been criticized for viewing the social skills of students of color through a deficient lens, overemphasizing self-regulation and underemphasizing student agency to resist injustice and avoiding the difficult issues that true social awareness and empathy would open up for students. One goal of SEL should be to create caring communities that tackle courageous conversations about injustice, hate, violence, and inequality, not just anger management or decision making (Simmons, 2019). Cluster 4 explores these possibilities.

LIVING WITH SOCIAL-EMOTIONAL TRAUMA. Almost half of all elementary school students in the United States have experienced or witnessed traumatic events (Koslouski & Stark, 2021). An entire issue of the *American Psychologist* was devoted to adverse childhood experiences and trauma (Portwood et al., 2021). What kinds of traumas do students experience? The last few years provide so many examples: hurricanes and tornadoes that rip through communities, floods and fires that destroy homes, lockdowns from pandemic viruses, undrinkable water, police brutality replayed endlessly in videos, protests and counterprotests, attacks on the U.S. Capitol, televised images of collapsing buildings, and mass shootings, including in many schools. But trauma has always been in children's lives in the form of child abuse, divorce, deaths, parental drug and alcohol addictions, bullying, food insecurity, community violence, medical procedures, and even serious accidents. Teachers may not be aware that many students show up in their classrooms straining under the weight of "invisible backpacks" filled with traumatic burdens. Students living in poverty, students facing racism every day, students with disabilities, and immigrant students are especially vulnerable (Santiago et al., 2018). Because trauma can affect so many aspects of teachers' and students' lives, including brain development and learning, we will revisit this topic in several upcoming clusters. The educational challenges, health care inequalities, and economic devastation that came with the coronavirus pandemic certainly set the stage for increased trauma among students and teachers.

No matter what policies your school or the government adopts, what trends affect schools, or what traumas your students experience, capable and confident teachers will be required. But is that true? Do teachers really make a difference? Good question.

Do Teachers Make a Difference?

We usually consider school achievement to be an outcome—a goal for our students. But doing well in school can also cause other outcomes. In fact, there is some evidence that education and doing well in school are related to well-being and to high IQ scores in adulthood (Ritchie & Tucker-Drob, 2018; Tomsaik et al., 2019). So education can make a difference, but what about teaching, and how would you decide? Perhaps one of your teachers influenced your decision to become an educator. Even if you had such a teacher, and we hope you did, one of the purposes of educational psychology in general and this text in particular is to go beyond individual experiences and testimonies, powerful as they are, to examine larger groups. The results of many large-group studies speak to the power of teachers in the lives of students, as you will see next.

TEACHER–STUDENT RELATIONSHIPS. Bridgett Hamre and Robert Pianta (2001) monitored all the children who entered kindergarten one year in a small school district and continued to do so in that district through the eighth grade. The researchers concluded that the quality of the teacher–student relationship in kindergarten (defined in terms of level of conflict with the child, the child's dependency on the teacher, and the teacher's affection for the child) predicted several academic and behavioral outcomes *through the eighth grade*, particularly for students with many behavior problems. Even when the gender, ethnicity, cognitive ability, and behavior ratings of the student were accounted for, the relationship with the teacher still predicted aspects of school success. So students with significant behavior problems in the early years are less likely to have problems later in school if their first teachers are sensitive to their needs and provide frequent, consistent feedback. Of course, forming positive relationships with challenging students isn't easy. When students act out, teachers can respond negatively, and the cycle of student behavior problems and teacher conflict continues. Forming positive relationships with students also means breaking the cycle of conflict by teaching the students better ways to deal with anger and frustration—the role of social and emotional learning again (de Jong et al., 2018).

The connection between teacher relationships and student outcomes is widespread. Pianta's research team has documented the importance of teacher–student relationships in many other studies that followed students for years (e.g., Ansari et al., 2020). Daniel Quin (2017) reviewed 46 studies, including studies that followed students over time, and reached similar conclusions—better teacher–student relationships predicted student engagement. In Germany, secondary students who reported higher levels of teacher support also were more satisfied with school, and in the United States, positive teacher relationships predicted social-emotional development and reading achievement for elementary school students (Aldrup et al., 2018; Rucinski et al., 2018). And as you will learn in Clusters 13 and 14, teacher warmth is one element of effective teaching (Sandilos et al., 2019).

Positive relationships with students are important for teachers as well. Remember our expert teacher Ken, who always took the time to respond to students' personal concerns shared in their journals? He would not be surprised that teachers who have close relationships with their students experience high levels of accomplishment and that teachers who report more conflict in student relationships feel more emotional exhaustion and burnout (Corbin et al., 2019). So evidence is mounting for a strong association between the quality of teacher–student relationships and important outcomes for both students and teachers.

THE COST OF POOR TEACHING. Several years ago, in a widely publicized study, researchers examined how students are affected by having several effective or ineffective teachers in a row (Sanders & Rivers, 1996). They looked at fifth-graders in two large metropolitan school systems in Tennessee. Students who had highly effective teachers for third, fourth, and fifth grades scored at the 83rd percentile on average on a standardized mathematics achievement test in one district and at the 96th percentile in the other district (99th percentile is the highest possible score). In contrast, students who had the least effective teachers 3 years in a row averaged at the 29th percentile in math achievement in one district and 44th percentile in the other—a difference of more than 50 percentile points in both cases! Students who had average teachers or a mixture of teachers with low, average, and high effectiveness for the 3 years had math scores between these extremes. Sanders and Rivers concluded that the best teachers encouraged good to excellent gains in achievement for all students, but lower-achieving students were the first to benefit from good teaching. The effects of teaching were cumulative and residual; that is, better teaching in a later grade can partially make up for less effective teaching in earlier grades but cannot erase all the deficits traced to poor teachers (Hanushek et al., 2005; Rivkin et al., 2001).

Effective teachers who establish positive relationships with their students appear to be a powerful force in those students' lives. Students who have problems seem to benefit the most from good teaching. So an important question is "What makes a teacher effective? What is good teaching?"

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What Is Good Teaching?

Educators, psychologists, philosophers, novelists, journalists, filmmakers, mathematicians, scientists, historians, policy makers, and parents, to name only a few groups, have examined this question; there are hundreds of answers. And good teaching is not confined to classrooms. It occurs in homes and hospitals, museums and sales meetings, therapists' offices, and summer camps. In this book we are primarily concerned with teaching in classrooms, but much of what you will learn applies to other settings as well.

So is good teaching science or art? The application of research-based theories or the creative invention of specific practices? Is a good teacher an expert explainer ("a sage on the stage") or a great coach ("a guide by the side")? These debates have raged for years. In your other education classes, you probably will encounter criticisms of the scientific, teacher-centered sages. You will be encouraged to be inventive, student-centered guides. *But beware of either/or choices*. Teachers must be both knowledgeable and inventive. They must have some basic research-based routines for managing classes, but they must also be willing and able to break from the routine when the situation calls for change. They must know the research on student development, and they also need to know their own particular students, who are unique combinations of cultures, genders, and geographies. Personally, we hope you all become teachers who are both sages and guides, wherever you stand.

Another answer to "What is good teaching?" involves considering what different models and frameworks for teaching have to offer. We look at them next.

Models of Good Teaching

We will briefly examine three frameworks to help answer the question "What is good teaching?" Another reason to consider these models is that when you become a teacher, you might be evaluated based on one of these approaches or something like them—teacher evaluation is a very hot topic these days! In fact, the Every Student Succeeds Act requires teacher evaluation systems to use multiple measures of effectiveness. We will look at Charlotte Danielson's Framework for Teaching, the high-leverage practices identified by TeachingWorks at the University of Michigan, and the CLASS framework developed by Robert Pianta and his colleagues (2008b).

DANIELSON'S FRAMEWORK FOR TEACHING. The Framework for Teaching was first published in 1996 and has been revised three times since then, most recently in 2013 (see http://danielsongroup.org for information about Charlotte Danielson and the Framework for Teaching). According to Danielson (2013):

> The Framework for Teaching identifies those aspects of a teacher's responsibilities that have been documented through empirical studies and theoretical research as promoting improved student learning. While the Framework is not the only possible description of practice, these responsibilities seek to define what teachers should know and be able to do in the exercise of their profession. (p. 1)

Danielson's Framework has four domains or areas of responsibility: *Planning and Preparation, Classroom Environment, Instruction*, and *Professional Responsibilities*. Each domain is further divided into five or six components, making a total of 22 components for the entire framework. For example, Domain 1: Planning and Preparation, is divided into six components:

1a Demonstrating knowledge of content and pedagogy

1b Demonstrating knowledge of students

1c Setting instructional objectives

1d Demonstrating knowledge of resources

1e Designing coherent instruction

1f Designing student assessments

When the Framework is used for teacher evaluation, each of these 22 components is further divided into elements (76 in all), and several indicators are specified for each component. For example, component 1b, demonstrating knowledge of students, includes the elements describing knowledge of:

- Child and adolescent development.
- The learning process.
- Students' skills, knowledge, and language proficiency.
- Students' interests and cultural heritage.
- Students' special needs.

Indicators of this knowledge of students include the formal and informal information about students that the teacher gathers when planning instruction, the students' interests and needs the teacher identifies, the teacher's participation in community cultural events, opportunities the teacher has designed for families to share their cultural heritages, and any databases the teacher has for students with special needs (Danielson, 2013).

The evaluation system further defines four levels of proficiency for each of the 22 components—unsatisfactory, basic, proficient, and distinguished—with a definition, critical attributes, and possible examples of what each level might look like in action. Two examples of distinguished *knowledge of students* are a teacher who plans lessons with three different follow-up activities designed to match different students' abilities and a teacher who attends a local Mexican heritage event to meet members of her students' extended families. Many other examples are possible, but these two give a sense of distinguished *knowledge of students* (component 1b).

You can see that it would take extensive training to use this framework well for teacher evaluation. When you become a teacher, you may learn more about this concept of good teaching because your school district is using it—this framework forms the basis of teacher evaluation in several states. For now, be assured that you will gain knowledge and skills in all 22 components in this text. For example, you will gain knowledge of students (component 1b) in Clusters 2 through 6.

TEACHINGWORKS. TeachingWorks is a national project based at the University of Michigan that is dedicated to improving teaching practice. Project members working with experienced teachers have identified 19 high-leverage teaching practices, defined as the basic fundamentals of teaching—actions that are central to teaching and useful across most grade levels, academic subjects, and teaching situations (see Table 1.1 on the next page). Again, you will develop skills and knowledge about all of these practices in this text. (For a more complete description of the 19 high-leverage practices, see https://library.teachingworks.org/curriculum-resources/high-leverage-practices/.)

When you compare the high-leverage practices in Table 1.1 with the Danielson components listed earlier, do you see similarities and overlaps?

THE CLASS MODEL. An important conception of good teaching is based on a large-scale program of longitudinal research by Robert Pianta and his colleagues (Allen et al., 2013; Crosnoe et al., 2010; Hafen et al., 2012; Jerome et al., 2009; Luckner & Pianta, 2011; Pianta et al., 2008a, 2008b). Pianta's work has identified three domains of teacher–student interactions in the classroom that are related to development and learning for preschool through high school students, regardless of where the students live or their families' incomes, as you can see in Table 1.2 on the next page. Using these three domains, the researchers have also developed a set of classroom observation instruments called CLASS—for the Classroom Assessment Scoring System (https://teachstone.com/class). Schools in your district might use these instruments for class observation or professional development.

The *affective* domain in Pianta's model is teacher *emotional support*, similar to teacher warmth and enthusiasm identified in early research on teacher effectiveness and described in Cluster 14. The *cognitive* domain is instructional support, which includes different dimensions, depending on the age of the student. For example, language modeling is a dimension of instructional support through early elementary school, but content understanding,

Table 1.1 TeachingWorks 19 High-Leverage Teaching Practices

These practices are based on research evidence, the wisdom of practice, and logic.

1. Leading a group discussion
2. Explaining and modeling content, practices, and strategies
3. Eliciting and interpreting individual students' thinking
4. Diagnosing particular common patterns of student thinking and development in a subject-matter domain
5. Implementing norms and routines for classroom discourse and work
6. Coordinating and adjusting instruction during a lesson
7. Specifying and reinforcing productive student behavior
8. Implementing organizational routines
9. Setting up and managing small-group work
10. Building respectful relationships with students
11. Talking about a student with parents or other caregivers
12. Learning about students' cultural, religious, family, intellectual, and personal experiences and resources for use in instruction
13. Setting long- and short-term learning goals for students
14. Designing single lessons and sequences of lessons
15. Checking student understanding during and at the conclusion of lessons
16. Selecting and designing formal assessments of student learning
17. Interpreting the results of student work, including routine assignments, quizzes, tests, projects, and standardized assessments
18. Providing oral and written feedback to students
19. Analyzing instruction for the purpose of improving it

Source: Reprinted with permission from TeachingWorks (2014), *High-leverage practices*. Retrieved from http://www.teachingworks.org/work-of-teaching/high-leverage-practices.

Table 1.2 A Model of Teacher–Student Interactions in Early Elementary Classrooms

ASPECT OF TEACHING	DOMAIN OF TEACHER–STUDENT INTERACTIONS	DIMENSIONS	DEFINITIONS AND EXAMPLES
Affective	**Emotional Support**	*Positive Climate*	Warmth, mutual respect, positive emotional connections between teacher and students
		Negative Climate (negative predictor of learning)	Disrespect, anger, hostility
		Teacher Sensitivity	Consistency and effectiveness in responding to students' academic and emotional needs
		Regard for Students' Perspectives	Activities that encourage student autonomy and emphasize students' interests, motivations, and points of view
Cognitive	**Instructional Support**	*Concept Development*	Activities and discussion that promote higher-order thinking skills and cognition
		Quality of Feedback	Consistency in providing specific, process-oriented feedback and back-and-forth exchanges to extend students' learning
		Language Modeling	Teachers' modeling more complex language for students in conversations with them and encouraging student talk

ASPECT OF TEACHING	DOMAIN OF TEACHER–STUDENT INTERACTIONS	DIMENSIONS	DEFINITIONS AND EXAMPLES
Behavioral	**Classroom Organization**	*Behavior Management*	Teachers' effectiveness in monitoring, preventing, and redirecting misbehavior
		Productivity	How consistently learning is maximized with clear activities and routines, teacher preparation, efficient transitions, and minimal disruptions
		Instructional Learning Formats	How well materials, modalities, and activities are used to engage students in learning

Source: Based on Brown et al. (2010). Improving classroom quality: Teacher influences and experimental impacts of the 4Rs program. *Journal of Educational Psychology, 102*, 153–167 and Gregory et al. (2017). My teaching partner-secondary: A video-based coaching model. *Theory into Practice, 56*(1), 38–45.

analysis, and inquiry become important in the later grades. Quality of feedback is included for every grade. The third domain is classroom organization, which includes *behavioral* concerns such as classroom and lesson management, with clear activities and routines that make more time for student learning and are really engaging—we explore these critical organizational dimensions of teaching in depth in Cluster 13.

Is all this talk about expert teachers and effective teaching making you a little nervous? Viviana, Ken, and Joan are experts at the science and art of teaching, but they have years of experience. What about you?

Beginning Teachers

Stop & Think Imagine walking into your first day of teaching. List the concerns, fears, and worries you have. What assets do you bring to the job? What would build your confidence to teach?

Beginning teachers everywhere share many concerns, including maintaining classroom discipline, motivating students, meeting students' different needs, evaluating students' work, dealing with parents, getting along with other teachers, being evaluated by supervisors, and dealing with paperwork and lesson planning (Brichinall et al., 2019; Melnick & Meister, 2008). Many teachers also experience what has been called "reality shock" when they take their first job because they really cannot ease into their responsibilities. On the first day of their first job, beginning teachers face the same tasks as teachers with years of experience. Student teaching, while a critical element, does not really prepare prospective teachers for starting off a school year with a new class. If you listed any of these concerns in your response to the *Stop & Think* question, you shouldn't be troubled. They come with the job of being a beginning teacher (Armstrong, 2018; Borko & Putnam, 1996).

With experience, hard work, and good support, seasoned teachers can focus on their students' needs and judge their own success by looking at their students' accomplishments. One experienced teacher described the shift from concerns about yourself to concerns about your students in this way: "The difference between a beginning teacher and an experienced one is that the beginning teacher asks, 'How am I doing?' and the experienced teacher asks, 'How are the children doing?'" (Codell, 2001, p. 191).

But here is one study that ought to give you confidence, even as a beginner: When Linda Graham and her colleagues (2020) analyzed CLASS observation data from 80 elementary grade teachers, they concluded, "Beginning teachers are doing as well or better than teachers with more years of experience, but… the overall quality of teaching could be higher" (p. 8). So enter your teaching career with confidence and strive to get even better

Connect and Extend to PRAXIS II®

Teacher Professionalism (IV, A1)

Your professional growth relies on your becoming a member of a community of practice. The national organizations listed here have hundreds of affiliations and chapters across the country, with regular conferences, conventions, and meetings to advance instruction in their areas. Take a look at their websites to get a feel for their approaches to issues related to professionalism.

- National Council of Teachers of English (http://ncte.org)
- International Literacy Association (http://reading.org)
- National Science Teachers Association (http://www.nsta.org)
- National Council for the Social Studies (http://www.socialstudies.org)
- National Council of Teachers of Mathematics (http://www.nctm.org)

Table 1.3 Advice for Student Teachers from Their Students

The students in Ms. Amato's first-grade class gave this advice as a present to their student teacher on her last day.

1. Teach us as much as you can.
2. Give us homework.
3. Help us when we have problems with our work.
4. Help us to do the right thing.
5. Help us make a family in school.
6. Read books to us.
7. Teach us to read.
8. Help us write about faraway places.
9. Give us lots of compliments, like "Oh, that's so beautiful."
10. Smile at us.
11. Take us for walks and on trips.
12. Respect us.
13. Help us get our education.

Source: Nieto, Sonia, *Affirming diversity: The sociopolitical context of multicultural education*, 4th ed., © 2004. Reprinted and Electronically reproduced by permission of Pearson Education, Inc. Upper Saddle River, New Jersey.

every year. Our goal in writing this book is to give you the foundation for becoming an expert as you gain experience. One thing experts do is listen to their students. Table 1.3 shows some advice a first-grade class gave to their student teacher: It looks like the students know about good teaching, too.

We began this cluster claiming that educational psychology is the one of the most important courses you will take. OK, maybe we are a bit biased—we have been teaching the subject for a combined total of more than 50 years! So let us tell you more about our favorite topic.

Module 1 Summary

Learning and Teaching Today (pp. 4–11)

What are classrooms like today? About 25% of U.S. children under 18 are living in immigrant families. By 2045, half of the U.S. population will be members of some minority group, with about 25% being Hispanic. Around 21% of American children currently live in poverty. More than half of school-age students with disabilities receive most of their education in general education classrooms. Even though students in classrooms are increasingly diverse in race, ethnicity, language, and economic level, teachers are much less diverse—the percentage of White teachers is increasing, while the percentage of Black teachers is falling. This book is about understanding the complex processes of development, learning, motivation, teaching, and assessment so that you can become a capable and confident teacher with a high but authentic sense of efficacy.

What are NCLB and ESSA? The No Child Left Behind Act (NCLB) of 2002 required extensive standardized achievement testing. The law also required all students in the schools to reach full proficiency in these subjects by the end of the 2013–2014 school year; it didn't happen. Largely because there were major penalties for schools that did not perform well, several negative consequences followed in the wake of the tests—teaching to the test, narrowing the curriculum to a few subjects, driving teachers out of the classroom. The Every Student Succeeds Act (ESSA), which replaced NCLB, returned most of the control to the states. Testing in the same grades and subjects still takes place, but states and local schools decide when and how to test and how to intervene in the lowest-performing schools. The states must use evidence-based practices to intervene in

failing schools. ESSA also supports the establishment of teacher education academies outside colleges and universities.

What is SEL—social-emotional learning? SEL is learning to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions. The Collaborative for Academic, Social, and Emotional Learning (CASEL) provides resources and information for educators. There is good evidence that SEL can have positive effects on students' academic achievements and social behaviors. Teachers can introduce specific strategies or larger curriculum programs such as PATHS. Even-more-comprehensive curricular programs can support both academic and social-emotional objectives. Important social and emotional concerns include the traumatic events that many students have experienced or witnessed.

What evidence is there that teachers make a difference? Several studies speak to the power of teachers in the lives of students. The first found that the quality of the teacher–student relationship in kindergarten predicted several aspects of school success through the eighth grade. The second study found similar results for students from preschool through fifth grade, a finding confirmed by almost 100 students in countries around the world. The third study examined math achievement for students in two large school districts as they moved through third, fourth, and fifth grades. Again, the quality of the teacher made a difference: Students who had three high-quality teachers in a row were way ahead of peers who spent 1 or more years with less-competent teachers. In a study that followed children from third through fifth grades, two factors helped children with lower skills in mathematics begin to close the achievement gap: higher-level (not just basic skills) instruction and positive relationships with teachers.

What Is Good Teaching? (pp. 12–16)

Teachers must be both knowledgeable and inventive. They must be able to use a range of strategies, and they must also be capable of inventing new strategies. They must have some basic research-based routines for managing classes, but they must also be willing and able to break from the routine when the situation calls for change. They must know the research on student development, and they also need to know their own particular students, who are unique combinations of culture, gender, and geography.

What are some research-based models of effective teaching? Charlotte Danielson describes a Framework for Teaching, which has 22 components organized into four domains or areas of teaching responsibility: Planning and Preparation, Classroom Environment, Instruction, and Professional Responsibilities. This framework is the basis for a widely used system of teacher evaluation. TeachingWorks, a national project based at the University of Michigan and dedicated to improving teaching practice, has identified 19 high-leverage teaching practices, defined as actions that are central to teaching and useful across most grade levels, academic subjects, and teaching situations. Finally, a program of large-scale, longitudinal research has identified three aspects of classroom climate that are related to the development and learning of preschool and elementary school students. These three dimensions are consistent with the characteristics of teachers identified in earlier research on teaching and cover affective, behavioral, and cognitive dimensions. The *affective* dimension is teacher *emotional support*, similar to teacher warmth and enthusiasm identified in early research. The *cognitive* dimension is instructional support, which includes concept development (activities and discussions that promote students' higher-order thinking) and quality feedback that is specific and focused on the learning process. The third dimension is classroom organization, which includes *behavioral* concerns such as classroom and lesson management with clear activities and routines that make more time for learning and really engage students.

What are the concerns of beginning teachers? Learning to teach is a gradual process. The concerns and problems of teachers change as they grow in their ability. During the beginning years, attention tends to be focused on maintaining discipline, motivating students, accommodating differences among students, evaluating students' work, dealing with parents and paperwork,

being evaluated by supervisors, and getting along with other teachers. Even with these concerns, many beginning teachers bring creativity and energy to their teaching and improve every year. The more experienced teacher can move on to concerns about professional growth and effectiveness in teaching a wide range of students.

MODULE 2 Research and Theory in Educational Psychology

Learning Objective 1.3 Describe the methods used to conduct research in the field of educational psychology and the kinds of questions each method can address.

Learning Objective 1.4 Recognize how theories and research in development and learning are related to educational practice.

The Role of Educational Psychology

A quick look at history shows that educational psychology and teaching have been closely linked since the beginning. The founders of psychology in the United States believed education was an important arena for investigation (Alexander, 2018). At Harvard in 1890, William James founded the field of psychology and developed a lecture series for teachers titled *Talks to Teachers about Psychology* (it's worth a read, by the way). These lectures were given in summer schools for teachers around the country and then published in 1899. James's student, G. Stanley Hall, founded the American Psychological Association. Teachers helped him collect data for his dissertation about children's understandings of the world. Hall encouraged teachers to make detailed observations to study their students' development—as his mother had done when she was a teacher. Hall's student John Dewey founded the Laboratory School at the University of Chicago and is considered the father of the progressive education movement. Another of William James's students, E. L. Thorndike, wrote the first educational psychology text in 1903 and founded the *Journal of Educational Psychology* in 1910 (Berliner, 2006; Hilgard, 1996; Pajares, 2003). We go way back!

Educational Psychology Today

Educational psychology
The discipline concerned with teaching and learning processes; applies the methods and theories of psychology and has its own as well.

What is educational psychology today? The view generally accepted is that **educational psychology** is a distinct discipline with its own theories, research methods, problems, and techniques. Educational psychologists do research on learning and teaching and, at the same time, work to improve educational policy and practice (Anderman, 2011). To understand as much as possible about learning and teaching, educational psychologists examine what happens when someone (a teacher or parent or software designer) teaches something (math or weaving or dancing) to someone else (student or coworker or team) in some setting (classroom or theater or gym) (Berliner, 2006). So educational psychologists study child and adolescent development; learning and motivation—including how people learn different academic subjects such as reading or mathematics; social and cultural influences on learning; teaching and teachers; and assessment, including testing (Alexander & Winne, 2006).

But even with all this research on so many topics, are the findings of educational psychologists really that helpful for teachers? After all, most teaching is just common sense, isn't it? Let's take a few minutes to examine these questions.

Is It Just Common Sense?

In many cases, the principles set forth by educational psychologists—after spending much thought, time, and money for research—sound pathetically obvious. People are tempted to say, and usually do say, "Everyone knows that!" Consider these examples.

LEARNING STYLES. Students have different learning styles that are dominated by particular senses (visual, auditory, etc.), and they will learn best when they receive information in their preferred learning style.

Commonsense Answer. Of course, we are all different. Some of us are visual learners, and some have to hear information to learn. Most people can describe their own learning style and learn best using that style.

ANSWER BASED ON RESEARCH. This is one of the most persistent myths in education—a "zombie" belief that just won't die. In fact, Kelly Macdonald and her colleagues (2017) found that 93% of the general public and 76% of educators believed this myth even though study after study has shown that students do not learn more when taught in their preferred style (Pashler et al., 2009, Willingham et al., 2015). There are two underlying truths that encourage the persistence of this myth: People do have a preference for how to receive information, and teachers do achieve better results if they present information in multiple sensory modes. So this myth is made up of a seed of facts, some emotional bias, and just plain wishful thinking that a simple key to good teaching exists. Unfortunately, what you prefer—say, ice cream and cake as your dinner every night—is not always good for you. People simply do not learn best when taught in their preferred style (Scudellari, 2015). OK—we sense your skepticism. In Cluster 5, we will dig deeper into the question of learning styles.

SKIPPING GRADES. Should a school encourage exceptionally bright students to skip grades or to enter college early?

Commonsense Answer. No! Very intelligent students who are several years younger than their classmates are likely to be social misfits. They are neither physically nor emotionally ready for dealing with older students and would be miserable in the social situations that are so important in school, especially in the later grades.

ANSWER BASED ON RESEARCH. Maybe. In the report *A Nation Empowered: Evidence Trumps the Excuses Holding Back America's Brightest Students*, the authors note, "Extensive research has indicated that acceleration has positive effects on the academic as well as the affective lives of students," but "decisions about individual students must be based on more than research" (Assouline et al., 2015, p. 2). One example of positive long-term effects is that mathematically talented students who skipped grades in elementary or secondary school were more likely to go on to earn advanced degrees and publish widely cited articles in scientific journals (Park et al., 2013). Whether acceleration is the best solution for a particular student depends on many specific individual characteristics, including the intelligence and maturity of the student as well as the other available options. For some students, moving quickly through the material and working in advanced courses with older students can be a very positive experience (Kretschmann et al., 2014). See Cluster 5 for more on adapting teaching to students' abilities.

STUDENTS IN CONTROL. Does giving students more control over their own learning—more choices—help them learn?

Commonsense Answer. Of course! Students who choose their own learning materials and tasks will be more engaged and thus learn more.

ANSWER BASED ON RESEARCH. Not so fast! Sometimes giving students more control and choice can support learning, but many times it doesn't. For example, giving lower-ability students choice in learning tasks sometimes means the students just keep practicing what they already do well instead of tackling tougher assignments. This happened when hairdressing students were given choices. The lower-ability students kept practicing easy tasks such as washing hair but were reluctant to try more difficult tasks such as giving permanents. When they developed portfolios to monitor their progress and received regular coaching

and advice from their teachers, the students made better choices—so guided choice and some teacher control may be useful in some situations (Kicken et al., 2009).

OBVIOUS ANSWERS? Years ago, Lily Wong (1987) demonstrated that just seeing research results in writing can make them seem obvious. She selected 12 findings from research on teaching. She presented six of the findings in their correct form and six in exactly the opposite form to both college students and experienced teachers. Both the college students and the teachers rated about half of the wrong findings as "obviously" correct. Jeanne Oakes has an idea about why "obvious answers" are so powerful: "Everybody's firsthand schooling experience often makes research seem irrelevant—that it unnecessarily documents what everybody already knows or unhelpfully contradicts what's obviously true" (2017, p. 94).

Paul Kirschner and Joren van Merriënboer (2013) made a similar point when they challenged several "urban legends" in education, including the assertion that learners (like the hairdressing students just described) know best how to learn. These current, strongly held beliefs about students as self-educating digital natives who can multitask, have unique learning styles, and always make good choices about how to learn *have no strong basis in research*, but still they are embraced.

You might have thought that educational psychologists spend their time discovering the obvious. The preceding examples point out the danger of this kind of thinking. When a principle is stated in simple terms, it can sound simplistic. A similar phenomenon takes place when we see a professional dancer or athlete perform: The well-trained performer makes it look easy. But we see only the results of the training, not all the work that went into mastering the individual movements. And bear in mind that any research finding—or its opposite—may sound like common sense. The issue is not what *sounds* sensible but what is *demonstrated* when the principle is put to the test in research—our next topic.

Using Research to Understand and Improve Learning

Stop & Think Quickly list all the different research methods you can think of.

Educational psychologists design and conduct many different kinds of research studies. But before we explore some of the main methods in those studies, let's take a moment to emphasize critical thinking about research in general. In this book and many others, you will encounter studies and research claims. Sometimes the claims will seem contradictory. Being a critical consumer of research, not just in your profession but also in the general media, is important. How strong is the evidence for a claim? Did the researchers study just a few people or many, over a short time or longer? Did what was assessed match what was taught or the goals of the program? Are the students in the study similar to yours? Is the school and community context like your situation? Research results can give you ideas to try, new concepts—tools to think with. But you must bring your own inventiveness and clear thinking to the process.

Descriptive studies
Studies that collect detailed information about specific situations, often using observation, surveys, interviews, recordings, or a combination of these methods.

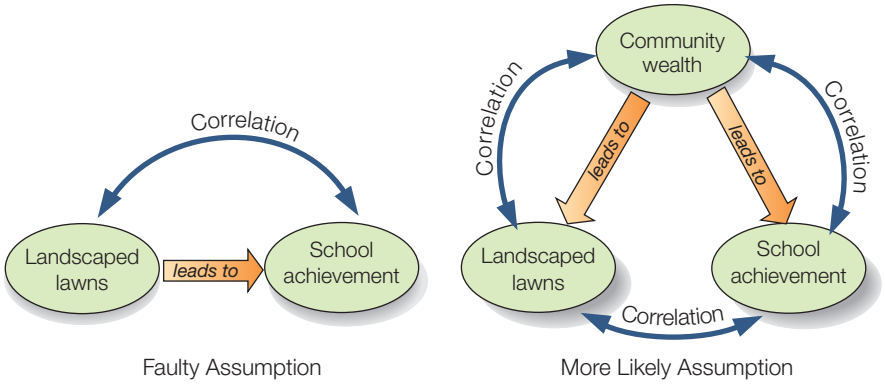
OK, with that caution, let's examine a common research method that involves simply describing events in a particular situation, called (you guessed it) **descriptive studies**.

CORRELATION STUDIES. Often, the results of descriptive studies include reports of correlations. You will encounter many correlations in the coming clusters, so let's take a minute to examine this concept. A **correlation** is a number that indicates both the strength and the direction of a relationship between two events or measurements. Correlations range from +1.00 to –1.00. The closer the correlation is to either +1.00 or –1.00, the stronger the relationship. For example, the correlation between adult weight and height is about .70 (a strong relationship); the correlation between adult weight and number of languages spoken is about .00 (no relationship at all).

Correlations
Statistical descriptions of how closely two variables are related.

Figure 1.1 Correlations Do Not Show Causation

When research shows that landscaped lawns and school achievement are correlated, it does not show causation. Community wealth, a third variable, may be the cause of both school achievement and landscaped lawns.



The sign of the correlation tells the direction of the relationship. A **positive correlation** indicates that the two factors increase or decrease together. As one gets larger, so does the other. Weight and height are positively correlated because greater weight tends to be associated with greater height. A **negative correlation** means that *increases* in one factor are related to *decreases* in the other; for example, the less you pay for a theater or concert ticket, the greater your distance from the stage. It is important to note that correlations do not prove cause and effect (see Figure 1.1). For example, weight and height are correlated—but gaining weight obviously does not *cause* you to grow taller. Knowing an individual's weight simply allows you to make a general prediction about that person's height. Educational psychologists identify correlations so they can make predictions about important events in the classroom.

EXPERIMENTAL STUDIES. A second type of research—**experimentation**—allows educational psychologists to go beyond predictions and actually study cause and effect. Instead of just observing and describing an existing situation, the investigators introduce changes and note the results. First, several comparable groups of participants are created. In psychological research, the term **participants** (also called **subjects**) generally refers to the people being studied—such as teachers or ninth-graders. One common way to make sure that groups of participants are essentially the same is to assign each person to a group using a random procedure. **Random** means each participant has an equal chance of being in any group. **Quasi-experimental studies** meet most of the criteria for true experiments, with the important exception that the participants are not assigned to groups at random. Instead, existing groups such as classes or schools participate in the experiments.

In experiments or quasi-experiments, for one or more of the groups studied, the experimenters change some aspect of the situation to see whether this change or "treatment" has an expected effect. The results in each group are then compared, often using statistics. When differences are described as **statistically significant**, it means that they probably did not happen simply by chance. For example, if you see $p < .05$ in a study, this indicates that the result reported could happen by chance less than 5 times out of 100, and $p < .01$ means less than 1 time in 100.

Several studies we will examine attempt to identify cause-and-effect relationships by asking questions such as this: If some teachers receive training in how to teach spelling using word parts (*cause*), will their students become better spellers than students whose teachers did not receive training (*effect*)? This actually was a *field experiment* because it took place in real classrooms and not in a simulated laboratory situation. In addition, it was a *quasi-experiment* because the students were in existing classes and had not been randomly assigned to teachers, so we cannot be certain the experimental and control groups were the

Positive correlation
A relationship between two variables in which the two increase or decrease together. Example: calorie intake and weight gain.

Negative correlation
A relationship between two variables in which a high value on one is associated with a low value on the other. Example: height and distance from top of head to the ceiling.

Experimentation
Research method in which variables are manipulated and the effects recorded.

Participants/subjects
People or animals studied.

Random
Without any definite pattern; following no rule.

Quasi-experimental studies
Studies that fit most of the criteria for true experiments, with the important exception that the participants are not assigned to groups at random. Instead, existing groups such as classes or schools participate in the experiments.

Statistically significant
Not likely to be a chance occurrence.

same before the teachers received their training. The researchers handled this by looking at improvement in spelling, not just final achievement level, and the results showed that the training worked (Hurry et al., 2005).

ABAB EXPERIMENTAL DESIGNS. The goal of ABAB designs is to determine the effects of a therapy, teaching method, or other intervention by first observing the participants for a baseline period (A) and assessing the behavior of interest, trying an intervention (B) and noting the results, removing the intervention and going back to baseline conditions (A), and finally reinstating the intervention (B). This form of design can help establish a cause-and-effect relationship (Plavnick & Ferreri, 2013). For example, a teacher might record how much time students are out of their seats without permission during a weeklong baseline period (A). The teacher then tries ignoring those who are out of their seats but praising those who are seated, again recording how many are wandering out of their seats for the week (B). Next, the teacher returns to the baseline conditions of just recording how many students are out of their seats with no comments to any of them (A) and then reinstates the praise-and-ignore strategy (B). In the classic study that first tested this intervention, the praise-and-ignore strategy proved effective in increasing the time students spent in their seats (C. H. Madsen et al., 1968).

Laws and policies from the U.S. government today emphasize experimental and quasi-experimental research, often called scientifically based research.

SCIENTIFICALLY BASED RESEARCH AND EVIDENCE-BASED PRACTICES. The No Child Left Behind Act emphasized *scientifically based research*, and the Every Student Succeeds Act (ESSA) requires "*evidence-based*" interventions in failing schools. In fact, we use the term "evidence-based" 10 times in this cluster and many more times in this book. What does this mean? Robert Slavin (2020) explains:

> Evidence of effectiveness is defined as evidence from rigorous experiments in which students experiencing experimental programs are compared over significant periods (say, a semester or more) to those using traditional control methods in terms of gains on valid measures of achievement or other outcomes. Ideally, students, teachers, and/or schools are assigned at random to experimental or random treatments. . . .but at a minimum, experimental and control students are well matched at pretest on measures such as achievement and demographic variables. (p. 22)

What Works Clearing House

A service of the U.S. Institute of Educational Studies that reviews the existing research on different programs, products, practices, and policies in education in order to provide educators with the information they need to make evidence-based decisions.

Where can teachers and schools find evidence-based practices (besides in this book, of course)? The U.S. Institute of Education Sciences (IES) has established a **What Works Clearinghouse** with a series of *Practice Guides* that contain recommendations from experts about various challenges that educators face—guides to action based on strong evidence from large-scale, well-designed research studies (https://ies.ed.gov/ncee/wwc/practiceguides). Each of the *Practice Guides* describes several strategies and rates the evidence supporting their use as "strong," "moderate," or "minimal." In the upcoming clusters, we will explore several of these guides, for example, *Improving Mathematical Problem Solving in Grades 4 through 8* in Cluster 9 (Woodward et al., 2018).

Educational psychologists also conduct other kinds of research—read on.

CLINICAL INTERVIEWS AND CASE STUDIES. Jean Piaget pioneered an approach called the *clinical interview* to understand children's thinking. The clinical interview uses open-ended questioning to probe responses and to follow up on answers. Questions go wherever the child's responses lead. Here is an example of a clinical interview with a 7-year-old. Piaget is trying to understand the child's thinking about lies and truth, so he asks, "What is a lie?"

> What is a lie?—*What isn't true. What they say that they haven't done*.—Guess how old I am.—*Twenty*. No, I'm thirty.—Was that a lie you told me?—*I didn't do it on purpose*.— I know. But is it a lie all the same, or not?—*Yes, it is the same, because I didn't say how old you were*.—Is it a lie?—*Yes, because I didn't speak the truth*.—Ought you be punished?—*No*.—Was it naughty or not naughty?—*Not so naughty*.—Why?—*Because I spoke the truth afterwards!* (Piaget, 1965, p. 144)

Researchers also may employ case studies. A **case study** investigates one person or situation in depth. For example, years ago Benjamin Bloom and his colleagues conducted in-depth studies of highly accomplished concert pianists, sculptors, Olympic swimmers, tennis players, mathematicians, and neurologists to try to understand what factors supported the development of outstanding talent. The researchers interviewed family members, teachers, friends, and coaches to build an extensive case study of each of these highly accomplished individuals (B. S. Bloom et al., 1985). Some educators recommend case study methods to identify students for gifted programs because the information gathered is richer than just test scores.

Case study
Intensive study of one individual or one situation.

ETHNOGRAPHY. **Ethnography**, borrowed from anthropology, involves studying the naturally occurring events in the life of a group to understand the meaning of these events to the people involved. In educational psychology research, ethnographies might study how students from different cultural groups are viewed by their peers or how teachers' beliefs about students' abilities affect classroom interactions. In some studies the researcher uses **participant observation**, actually participating in the group, to understand the actions from the perspectives of the people in the situation. Teachers can do their own informal ethnographies to understand life in their classrooms.

Ethnography
A descriptive approach to research that focuses on life within a group and tries to understand the meaning of events to the people involved.

Participant observation
A method for conducting descriptive research in which the researcher becomes a participant in the situation in order to better understand life in that group.

THE ROLE OF TIME IN RESEARCH. Many things that psychologists want to study, such as cognitive development (Cluster 3), happen over several months or years. Ideally, researchers would study the development by observing their participants over many years as changes occur. These are called *longitudinal studies*. They are informative but time-consuming, expensive, and not always practical: Keeping up with participants over several years as they grow up and move can be impossible. As a consequence, much research is *cross-sectional*, focusing on groups of students at different ages. For example, to study how children's conceptions of numbers change from ages 3 to 16, researchers can interview children of several different ages rather than follow the same children for 14 years.

WHAT'S THE EVIDENCE? QUALITATIVE VERSUS QUANTITATIVE RESEARCH. Here is a distinction you will encounter in your journey through educational psychology: the contrast between **qualitative research** and **quantitative research**. These are large categories and, like many categories, a bit fuzzy at the edges, but here are some simplified differences:

Qualitative research
Exploratory research that attempts to understand the meaning of events to the participants involved using such methods as case studies, interviews, ethnography, participant observation, and other approaches that focus on a few people in depth.

Quantitative research
Research that studies many participants in a more formal and controlled way using objective measures such as experimentation, statistical analyses, tests, and structured observations.

Qualitative Research. Case studies and ethnographies are examples of qualitative research. This type of research uses words, dialogue, events, themes, and images as data. Interviews, observations, and analysis of transcripts are key procedures. The goal is to explore specific situations or people in depth and to understand the meaning of the events to the people involved in order to tell *their* story. Qualitative researchers assume that no process of understanding meaning can be completely objective. They are more interested in interpreting subjective, personal, or socially constructed meanings.

Quantitative Research. Both correlational and experimental types of research generally are quantitative because measurements are taken and computations are made. Quantitative research uses numbers, measurements, and statistics to assess levels or sizes of relationships among variables or differences between groups. Quantitative researchers try to be as objective as possible in order to remove their own biases from their results. One advantage of good quantitative research is that results from one study can be generalized or applied to other, similar situations or people.

MIXED METHODS RESEARCH. Many researchers now are using *mixed methods* or *complementary methods* to study questions both broadly and deeply. These research designs are procedures for "collecting, analyzing, and 'mixing' both quantitative and qualitative methods in a single study or series of studies to understand a research problem" (Creswell, 2015, p. 537). A special issue of the journal *Contemporary Educational Psychology* (2019) described three basic ways of combining methods. First, a researcher collects both quantitative and qualitative data at the same time and then merges and integrates the data in the analyses. In

the second approach, the researcher collects quantitative data first—for example, from surveys or observation instruments—and then follows this by performing in-depth qualitative interviews of participants selected on the basis of their quantitative responses or observed actions. Often the goal here is to explain or look for causes. Finally, the sequence can be reversed—the researcher first conducts interviews or case studies to identify research questions and then collects quantitative data as guided by the qualitative findings. Here the goal may be to explore a situation deeply (McCrudden et al., 2019). My colleagues and I (Ellen talking this time) used mixed methods to study the sources of self-efficacy for students in grades 1 to 6 who lived in a high-poverty rural area of Central Appalachia. We found that different sources supported the self-efficacy of students in mathematics compared to science and that the gender of the student mattered as well (Usher et al., 2019).

In the final analysis, the methods used—quantitative, qualitative, or a mixture of both—should fit the questions asked (Bobbit Nolen, 2020). Different approaches to research can ask different questions and provide different kinds of answers, as you can see in Table 1.4.

You can find reports of the findings from all types of studies in journals that are referenced in this book. For years Anita was editor of the *Theory Into Practice* journal (http://tip.ehe.osu.edu). For a great overview of the past 50 years in educational research and practice, see the Special 50th Anniversary issue of *Theory Into Practice* (Gaskill, 2013). You might find some ideas for your own teaching and try them out—do your own action research, described next.

TEACHERS AS RESEARCHERS. Research also can be a way to improve teaching in one classroom or one school. The same kind of careful observation, intervention, data gathering, analysis, inquiry, close listening to students, and viewing the classroom through their eyes that occurs in research projects can be applied in any classroom to answer questions such as "Which writing prompts seem to encourage the most creative writing in my class?" "When does Kenyon seem to have the greatest difficulty concentrating on academic tasks?" "Would assigning task roles in science groups lead to more equitable participation of girls and boys

Table 1.4 What Can We Learn?

Different approaches to research can ask and answer different questions.

RESEARCH METHOD	PURPOSES/QUESTIONS ADDRESSED	EXAMPLE
Correlational	To assess the strength and direction of the relation between two variables; to make predictions	Is the average amount of homework completed weekly related to student performance on unit tests? If so, is the relation positive or negative?
Experimental	To identify cause-and-effect relations; to test possible explanations for effects	Will giving more homework cause students to learn more in science class?
ABAB Experiment	To identify the effects of a treatment or intervention for one or more individuals	When students record the number of pages they read each night, will they read more pages? If they stop recording, will their amount of reading return to the previous levels?
Case Studies	To understand one or a few individuals or situations in depth	How does one boy make the transition from a small rural elementary school to a large middle school? What are his main problems, concerns, issues, accomplishments, fears, supports, and so on?
Ethnography	To understand experiences from the participants' points of view: What are their meanings?	How do new teachers make sense of the norms, expectations, and culture of their new school, and how do they respond?
Mixed Methods	To ask complex questions involving causes, meanings, and relations among variables; to pursue both depth and breadth in research questions	Based on a study of 20 classrooms using quantitative observational instruments, select the 5 classes with the fewest behavior problems and the 5 with the most problems late in the year. Next, interview those teachers and their students, and analyze videotapes made the first weeks of school to answer the question "Did the effective and ineffective teachers differ in how they established rules and procedures in their classes?"

in the work?" This kind of problem-solving investigation is called **action research**. By focusing on a specific problem and making careful observations, teachers can learn a great deal about both their teaching and their students. Meghan Manfra (2019) says that action research lets us conceptualize teaching as inquiry—teachers continually learn and improve through research and reflection on their own practices.

Action research
Systematic observations or tests of methods conducted by teachers or schools to improve teaching and learning for their students.

So, after all this discussion about different approaches to research, you might be wondering, "Enough already—what kind of research should guide education?" Not a simple question. The Point/Counterpoint takes a deeper dive.

POINT/COUNTERPOINT: What Kind of Research Should Guide Education?

Policies in both health care and the treatment of psychological problems have emphasized evidence-based practices (McHugh & Barlow, 2010). Is this right for education?

Point

Yes, research should be scientific; educational reforms should be based on solid evidence. According to Robert Slavin (2020), tremendous progress has taken place in fields such as medicine, agriculture, transportation, and technology because these fields base their practices on scientific evidence. Randomized clinical trials and replicated experiments are the sources of the evidence. Until recently, however, teachers, principals, and superintendents were more likely to choose instructional programs for their schools by asking friends in another district or listening to sales representatives for commercial packages (Dagenais et al., 2012). But thanks to recent government policies that require evidence-based interventions for failing schools, educators are turning to proven programs that have been developed and tested using rigorous quantitative research. Not only is scientifically based research identifying promising practices, there are also websites available for educators to explore and compare the programs:

- Evidence for ESSA (https://www.evidenceforessa.org) lets you locate K–12 programs that meet ESSA standards in reading, math, social-emotional learning, attendance, science, and writing.
- What Works Clearinghouse (https://ies.ed.gov/ncee/wwc/) has K–12 programs and practices in many areas including for students with disabilities, English learners, behavior programs, and subject areas such as science or math.
- Best Evidence Encyclopedia (http://www.bestevidence.org) has full-scale academic reviews of research on programs in specific areas such as reading, math, and science.

Counterpoint

Experiments and controlled studies are not the only or even the best source of evidence for education. David Olson (2004) disagrees strongly with Slavin's position. He claims that we cannot use medicine as an analogy to education. "Treatments" in education are much more complex and unpredictable than administering one drug or another in medicine. And every educational program is changed by classroom conditions and the way it is implemented. Patti Lather, Anita's colleague at Ohio State, says, "In improving the quality of practice, complexity and the messiness of practice-in-context cannot be fantasized away. To try to do so yields impoverishment rather than improvement. That loss is being borne by the children, teachers, and administrators in our schools" (Lather, 2004, p. 30). David Berliner (2002) makes a similar point:

> Doing science and implementing scientific findings are so difficult in education because humans in schools are embedded in complex and changing networks of social interaction. The participants in those networks have variable power to affect each other from day to day, and the ordinary events of life (a sick child, a

(Continued)

messy divorce…a birthday party, alcohol abuse, a new principal, a new child in the classroom, rain that keeps the children from a recess outside the school building) all affect doing science in school settings by limiting the generalizability of educational research findings. Compared to designing bridges and circuits or splitting either atoms or genes, the science to help change schools and classrooms is harder to do because context cannot be controlled. (p. 19)

Beware of Either/Or

Qualitative research tells us specifically what happened in one or a few situations. Conclusions can be applied deeply but only to the issue that was studied. *Quantitative* research can tell us what generally happens under certain conditions. Conclusions can be applied more broadly. Complex problems in education require a whole range of methods for study as well as input from both researchers and educators. Educators must help researchers target the most important problems that need evidence-based solutions. Some current proponents of evidence-based interventions in education suggest that we benefit from the knowledge and wisdom of both practitioners and researchers. **Design-based research** does just that. Practitioners identify research questions based on problems of practice. Researchers then bring their time and talent to gather and analyze the data to address those problems (Scanlan, 2015).

Design-based research
Practitioners identify research questions based on problems of practice; then researchers gather and analyze the data to address those problems.

Theories for Teaching

As we saw earlier, the major goal of educational psychology is to understand what happens when someone teaches something to someone else in some setting (Berliner, 2006; Schwab, 1973). Reaching this goal is a slow process. There are very few landmark studies that answer a question once and for all. There are so many different kinds of students, teachers, tasks, and settings; and besides, human beings are pretty complicated. To deal with this complexity, research in educational psychology examines limited aspects of a situation—perhaps a few variables at a time or life in one or two classrooms. If enough studies are completed in a certain area and findings repeatedly point to the same conclusions, we eventually arrive at a **principle**. This is the term for an established relationship between two or more factors—between a certain teaching strategy, for example, and student achievement.

Principle
Established relationship between factors.

Another tool for building a better understanding of the teaching and learning processes is *theory*. The commonsense notion of theory (as in "Oh well, it was only a theory") is "a guess or hunch." But the scientific meaning of *theory* is quite different. A **theory** in science is a set of interrelated concepts, definitions, assumptions, and generalizations used to describe and explain data and to make predictions (Hoy & Adams, 2016). Educational psychologists have developed explanations for the relationships among many variables and even whole systems of relationships. There are theories to explain how language develops, why goals affect motivation, and, as noted earlier, how people learn.

Theory
Integrated statement of principles that attempts to explain a phenomenon and make predictions.

You will encounter many theories of development, learning, and motivation in this book. Theories are the beginning and ending points of the research cycle. In the beginning, theories provide the research **hypotheses** to be tested (predictions about what will happen) or the questions examined. For example, Piaget's theory might suggest the hypothesis that instruction cannot teach young children to think more abstractly, whereas Vygotsky's theory might suggest the competing hypothesis that instruction will be effective. Of course, at times, psychologists don't know enough to state hypotheses, so they just ask *research questions*. An example question might be "Is there a difference in the Internet usage of male and female adolescents from different ethnic groups?"

Hypothesis/hypotheses
A prediction of what will happen in a research study based on theory and previous research.

Research is a continuing cycle that involves:

- Clear specification of hypotheses, problems, or questions based on current theories.
- Systematic gathering and analysis of all kinds of information (data) about the questions from well-chosen research participants in carefully selected situations.

- Interpretation and analysis of the data gathered using appropriate methods to answer the questions.
- Modification and improvement of explanatory theories based on the results of those analyses.
- Formulation of new and better hypotheses based on the improved theories… and on and on.

This empirical process of collecting data to test and improve theories is repeated over and over. **Empirical** means "based on data." When researchers say that identifying an effective antibiotic or choosing a successful way to teach reading is an "empirical question," they mean that you need data and evidence to make the call. Constructing decisions from empirical analyses protects psychologists from developing theories based on personal biases, rumors, fears, faulty information, or preferences (Mertler & Charles, 2005). Good research is self-correcting. If predictions do not play out or if answers to carefully formulated questions do not support current best understandings (theories), then the theories have to be changed. You can use the same kind of systematic and self-correcting thinking in your work with students.

Empirical
Based on systematically collected data.

Few theories explain and predict perfectly. In this book, you will see many examples of educational psychologists taking different theoretical positions and disagreeing on the overall explanations of such broad topics as learning and motivation. Because no one theory offers all the answers, it makes sense to consider what each has to offer.

So why, you may ask, is it necessary to deal with theories? Why not just stick to principles? The answer is that both are useful. Principles of classroom management, for example, will give you help with specific problems. A good theory of classroom management, on the other hand, will give you a new way of thinking about discipline problems; it will give you cognitive tools for creating solutions to many different problems and for predicting what might work in new situations. A major goal of this book is to provide you with the best and the most useful theories of development, learning, motivation, and teaching—those theories that have solid evidence behind them. Although you might prefer some theories to others, consider them all as ways of understanding the challenges teachers face.

We began this cluster by asserting that educational psychology is our favorite topic as well as a key source of knowledge and skills for teaching. We end this cluster with one more bit of evidence for our enthusiasm: Educational psychology will help you support student learning—the goal of all teaching.

Supporting Student Learning

In an article in the *Educational Psychologist*, a major journal in our field, Jihyun Lee and Valerie Shute (2010) reported sifting through thousands of studies of student learning conducted over the course of 60 years, seeking to identify those that had direct measures of student achievement in reading and mathematics. Then they narrowed their focus to studies with strong effects. About 150 studies met all their rigorous criteria. Using the results from these studies, Lee and Shute identified about a dozen variables that were directly linked to K–12 student achievement. The researchers grouped these factors into two categories: *student personal factors* and *school and social-contextual factors*, as you can see in Table 1.5. When we read this article, we were pleased to see that our favorite subject, educational psychology, provides a base for developing knowledge and skills in virtually every area except principal leadership. (For that subject, you have to consult a book Anita wrote with her husband on principals as instructional leaders—Woolfolk Hoy & Hoy, 2020.)

As you can see in Table 1.5, this text should help you become a capable and confident teacher who can get students engaged in the classroom learning community—a community that respects its members. This book will guide you toward becoming a teacher who helps students develop into interested, motivated, self-regulated, and confident learners. As a consequence, you will be able to set high expectations for your students, rally the support of parents, and build your own sense of efficacy as a teacher.

Table 1.5 Research-Based Personal and Social-Contextual Factors That Support Student Achievement in K–12 Classrooms

STUDENT PERSONAL FACTORS	EXAMPLES	WHERE IN THIS TEXT
Student Engagement		
Engaging Students' Behavior	Make sure students attend classes, follow rules, and participate in school activities.	Clusters 5–7, 13
Engaging Students' Minds and Motivations	Design challenging tasks, tap intrinsic motivation, support student investment in learning, and nurture student self-efficacy and other positive academic beliefs.	Clusters 2, 3, 4, 10, 11, 12
Engaging Students' Emotions	Connect to student interest, pique curiosity, foster a sense of belonging and class connections, diminish anxiety, and increase enjoyment in learning.	Clusters 4, 5, 6, 10, 12
Learning Strategies		
Cognitive Strategies	Directly teach knowledge and skills that support student learning and deep processing of valuable information (e.g., summarizing, inferring, applying, and reasoning).	Clusters 7–9, 14
Metacognitive Strategies	Directly teach students to monitor, regulate, and evaluate their own cognitive processes, strengths, and weaknesses as learners; teach them about when, where, why, and how to use specific strategies.	Clusters 7–9, 11
Behavioral Strategies	Directly teach students strategies and tactics for managing, monitoring, and evaluating their actions, motivations, effects, and environments, such as skills in: time management test taking help seeking note taking homework management	Clusters 7–15

SOCIAL-CONTEXTUAL FACTORS	EXAMPLES	WHERE IN THIS TEXT
School Climate		
Academic Emphasis	Set high expectations for your students, and encourage the whole school to do the same; emphasize positive relations with the school community.	Clusters 11–13
Teacher Variables	If possible, teach in a school with the positive qualities of collective efficacy, teacher empowerment, and sense of affiliation.	Clusters 1, 11, 13
Principal Leadership	If possible, teach in a school with the positive qualities of collegiality, high morale, and clearly conveyed goals.	See Woolfolk Hoy and Hoy (2020).

SOCIAL-CONTEXTUAL FACTORS	EXAMPLES	WHERE IN THIS TEXT
Social-Familial Influences		
Parental Involvement	Support parents in supporting their children's learning.	Clusters 3–6, 12
Peer Influences	Create classroom and school norms that honor achievement, encourage peer support, and discourage peer conflict.	Clusters 4, 10, 13, 15

Source: Based on Lee, J., & Shute, V. J. (2010). Personal and social-contextual factors in K–12 academic performance: An integrative perspective on student learning. *Educational Psychologist*, *45*, 185–202.

Module 2 Summary

The Role of Educational Psychology (pp. 18–29)

What is educational psychology? Educational psychology has been linked to teaching since it began in the United States more than a century ago. The goals of educational psychology are understanding and improving the teaching and learning processes. Educational psychologists develop knowledge and methods; they also use the knowledge and methods of psychology and other related disciplines to study learning and teaching in everyday situations. Educational psychologists examine what happens when someone/something (a teacher or parent or computer) teaches something (math or weaving or dancing) to someone else (student or coworker or team) in some setting (classroom or theater or gym).

What are the research methods in educational psychology? Correlational methods identify relationships and allow predictions. A correlation is a number that indicates both the strength and the direction of a relationship between two events or measurements. The closer the correlation is to either +1.00 or –1.00, the stronger the relationship. Experimental studies allow researchers to detect causes, not just make predictions. Experimental studies should help teachers implement useful changes. Instead of just observing and describing an existing situation, the investigators introduce changes and note the results. Quasi-experimental studies meet most of the criteria for true experiments, with the important exception being that the participants are not assigned to groups at random. Instead, existing groups such as classes or schools participate in the experiments. In ABAB experimental designs, researchers examine the effects of treatments on one or more people, often by using a baseline/intervention/baseline/intervention approach. Clinical interviews, case studies, and ethnographies look in detail at the experiences of a few individuals or groups. If participants are studied over time, the research is called *longitudinal*. No matter what method is used, results from the research are used to further develop and improve theories so that even-better hypotheses and questions can be developed to guide future research.

What is the difference between qualitative and quantitative research? A general distinction between qualitative and quantitative research exists. These are large categories, and, like many categories, they are a bit fuzzy at the edges. Qualitative methods such as case studies and ethnographies use words, dialogue, events, themes, and images as data. Their goal is to explore specific situations or people in depth and to understand the meaning of the events to the people involved in order to tell their stories. Quantitative research uses numbers, measurements, and statistics to assess levels or sizes of relationships among variables or differences between groups—correlational and experimental research are examples. Different types of research can answer different questions. Today many researchers are using *mixed methods* to study questions both broadly and deeply. There are three basic ways of combining methods. First, a researcher collects both quantitative and qualitative data at the same time and then merges and integrates the data in the analyses. Second, the researcher collects quantitative data first, from, for example, surveys or observation instruments, and then follows this by performing in-depth qualitative interviews of selected participants. Often the goal is to explain or look for causes. Finally, the sequence can be reversed—the researcher first conducts interviews or case studies to identify research questions and then collects quantitative data as guided by the qualitative findings. Here the goal may be to explore a situation thoroughly.

Scientifically based research, which is more consistent with quantitative research, systematically uses observations or experiments to gather valid and reliable data; involves rigorous and appropriate procedures for gathering and analyzing the data; is clearly described so that it can be repeated by others; and has been rigorously reviewed by appropriate independent experts. Evidence-based practices, the kind that must be used to intervene in failing schools under the ESSA, are grounded in the results of systematic, rigorous research. When teachers or schools make systematic observations or test methods to improve teaching and learning for their students, they are conducting action research.

Distinguish between principles and theories. A principle is an established relationship between two or more factors—between, for example, a certain teaching strategy and student achievement. A theory is an interrelated set of concepts that is used to explain a body of data and to make predictions. The principles from research offer several possible answers to specific problems, and the theories offer perspectives for analyzing almost any situation that may arise. Research is a continuing cycle that involves clear specification of hypotheses or questions based on good theory, systematic gathering and analyzing of data, interpretation and analysis of the data gathered using appropriate methods to answer the questions, modification and improvement of explanatory theories based on the results, and the formulation of new, better questions based on the improved theories.

What key factors support student learning? A synthesis of about 150 studies of student learning found two broad categories of influence: *student personal factors* and *school and social-contextual factors*. Educational psychology provides a base for developing knowledge and skills in virtually every area except principal leadership.

Cluster 1 Review

Key Terms

Action research
Case study
Correlations
Descriptive studies
Design-based research
Educational psychology
Empirical
Ethnography
Experimentation
Hypothesis/hypotheses
Meta-analysis
Negative correlation
Participant observation
Participants/subjects
Positive correlation
Principle
Qualitative research
Quantitative research
Quasi-experimental studies
Random
Reflective
Social and emotional learning (SEL)
Statistically significant
Teachers' sense of efficacy
Theory
What Works Clearinghouse

Connect and Extend to Licensure

Multiple-Choice Questions

1. Novice teachers face numerous tasks and scenarios with which they have little prior experience. For teachers currently entering the field, which of the following is not a challenge they are apt to encounter?

A. Students who may exhibit superior technology skills as compared to their teachers

B. An increasingly diverse population of students and families

C. Inadequate resources to ensure the safety of their students while using technology in the classroom

D. Students who face the challenges associated with living in poverty

2. Both students and teachers work harder and persist longer when they have a high sense of efficacy. Which of the following does not enhance self-efficacy in both students and teachers?

A. Formal school relationships that focus solely on skills

B. Day-to-day success in achieving tasks

C. High expectations from those in the environment

D. Assistance from more knowledgeable partners

3. All the students in Ms. Clare's third-grade class engage in weekly test reviews. Ms. Clare believes that these reviews will enhance student retention when standardized testing occurs in the spring. Which of Ms. Clare's students will have his or her scores reported separately under the Every Student Succeeds Act (ESSA)?

A. Susan Frasier, who was recently identified with having a learning disability

B. Brendan Kincaid, who must wear corrective lenses in order to read

C. Miranda Ruiz, whose English is excellent even though her parents moved to the United States from Mexico only 10 years ago

D. Lauren Stone, who is a member of the third grade's cohort of students who are gifted and talented

Constructed-Response Questions

Case

Sandra Chapman was determined to add to her repertoire of teaching skills as she entered her second year of teaching. Her first year as a high school teacher proved to be more of a challenge than she had expected. Her school, located in the heart of the city, drew students from all walks of life and economic circumstances. Last year, she initially hoped that all of her students would master the history curriculum that she had inherited, but by midyear several of her students were not attending class on a regular basis. In an effort to increase attendance, she took points off students' grades when they missed class and intentionally ignored them when they returned. She believed that by not taking an interest in where they were, she would not reinforce their "skipping" behavior. She also thought that by continually reminding students of how much they did not know, she would encourage them to study. Sadly, these methods did not work well, and attendance only further declined. She is now in the process of designing some new strategies.

4. Identify the methods Sandra Chapman used to encourage attendance, and explain why these methods might have been unsuccessful.

5. What advice would you offer Sandra Chapman as she prepares to develop new methods?

What Would They Do?

Teachers' Casebook: Becoming a Great Teacher

At the beginning of this cluster, we asked you to think critically about what makes a great teacher and what sources of information might help. Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Anne Liners • 9th–12th-Grade Student Teacher

South High School, Fort Minneapolis, MN

I believe the most important part of being a reflective teacher is recognizing what your students need. If you're putting in the effort to listen, kids are pretty open about what is or isn't working for them. One of the strongest characteristics of good teachers is that they can effectively read their classrooms to see if the students are engaged, excited, bored, exhausted, confused, or antsy, and then use what they see to adapt their lessons and objectives. New research or cutting-edge approaches are effective only when they actually enhance the experiences and learning of students. A good teacher's loyalty is not necessarily to the latest studies and best-selling books (although those can help!) but instead to the well-being of the young people they are responsible for. The master teachers who have mentored me have been very forthcoming about the fact that they know they aren't able to effectively implement every possible new idea—no one is. Instead, they pick the research they can apply using their strengths, implement that research, then evaluate the effectiveness of the techniques based on the students' responses. Always keeping the practical realities of students in mind helps me define my own goals and practices.

India Chambers, ED.S. • 1st–8th-Grade Director of Academics

Northside Preparatory Academy, Cincinnati, OH

Great teachers have a genuine love for children and dedicate their practice, time, and knowledge base to helping their scholars shatter that glass ceiling. Great teachers devote their efforts to tangibly closing the achievement gap and

tapping into the untapped talents of their students. They embrace the promise and potential in every learner they encounter even through difficult times. When evaluating the quality of others' advice about teaching and learning, I base my evaluation upon the realities and practices in their classrooms. The same advice given should be clearly evident and observed in that individual's classroom. That would help me discern whether the teachers really "know" what they are talking about and if the given advice is even practical. Best practices are determined by the realities of each teacher's classroom and what has been proven by research to work for the population being served by the educator. It is helpful to research instructional strategies, interventions, and practices that have been shown by research studies to work for students who are similar demographically to the students in your classroom. Research that would convince me to change my practice include the studies that show substantial improvement depicted in data. These data would reflect quantitative analysis, trends, and correlations that prove the proposed action tested in the study positively impacted student outcomes.

Mari Ann Banks, PH.D. • Equity Officer
City Schools of Decatur, Decatur, GA

There is no singular representation of a great teacher. Good teachers come in all shapes, sizes, and dispositions, but the good become great by doing a few key things:

1. Great teachers identify the needs of their students, meet them where they are, and then help them develop the courage and skills to go further than they ever thought they could.
2. Great teachers know they will always be students themselves—and they are happy about that. They work to keep abreast of groundbreaking changes in the field and integrate valuable new knowledge into their praxis.
3. Great teachers implement culturally relevant, critical care for their students. They don't just "love all students" or claim that they "don't see color." Instead, they care by unmasking the hidden (and overt) curriculum that is so prevalent throughout the United States. They expose and unveil various forms of privilege, expand their curriculum to include multiple voices and perspectives, and show directly and by personal example how to make systemic change.

When evaluating the quality of teachers' advice and ideas, I make sure to look at their results. Not just test scores and grades of the advisor's students—in fact, that's the last thing I find important. Instead, I look to see what types of relationships they have established with students. Do students grow under their care? Are students challenged to think deeply about issues? Do students feel safe enough to ask questions about the way the world works, and, if so, are they encouraged to find the answers? If the answer to all of these is yes—that's the advice I want to hear. When faced with too much information or conflicting information, this is also how I decide in whom I will place my trust and energy.

Kathryn Larsen • Junior High School Principal
Pleasant Grove Junior High, Pleasant Grove, UT

- What makes someone a great teacher? How are "best" practices determined?

Great teachers foster belonging, equity, and unity in their classrooms. Many use best practices to accomplish this. Best practices are determined through both research and a genuine understanding of the students in your classroom. What works well with one group of students may not work the next year with another group of students. Every group has its own culture. When looking to research to help determine best practices, it is important to find seminal research that is supported by additional research. I have found that the results of the best education researchers are not contradictory. Instead, their work supports the work of many others.

- How do you evaluate the quality of others' advice about teaching and learning?

Try it for yourself! If you get advice from a trusted colleague, modify it to fit the needs of your own students and then go for it. This is where action research comes in. Implement the advice, modify it, try it again, and keep refining your practice. If the individual who gave you the advice is a trusted friend and colleague, ask that person to help you refine your practice. Teaching is very personal. What works for others may not work for you. However, by making small shifts to others' advice about teaching and learning, you will figure out what works for you and your students. Ask for student input when evaluating the quality of the advice you have received from others. Students know what works, but we rarely give them the autonomy and the voice they deserve to take part in evaluating teaching and learning.

- What would lead you to conclude that someone's advice was simply a trend versus a sound educational practice?

If I have gone through the action research process using advice from a colleague and am not seeing a pattern of positive results, higher levels of student achievement, and more engagement, I would know that I need to continue to modify that advice to make it work in my own classroom. I may also need to reconsider whether that advice should become a permanent part of my own practice. A practice you can trust becomes sound educational practice.

- What kinds of research findings would convince you to change your practice?

I am especially drawn to research that is conducted by teacher-researchers who are still in the classroom. The credibility this gives to the researcher is invaluable. When I read a research-based book about literacy practices written by a teacher-researcher who is working with her or his own students, I am more convinced that these same practices will work in my own classroom. The research findings from teacher-researchers feel very authentic and trustworthy, and I am more likely to change my own practice as a result.

Donnie Piercey • 5th-Grade Teacher and 2021 Kentucky State Teacher of the Year

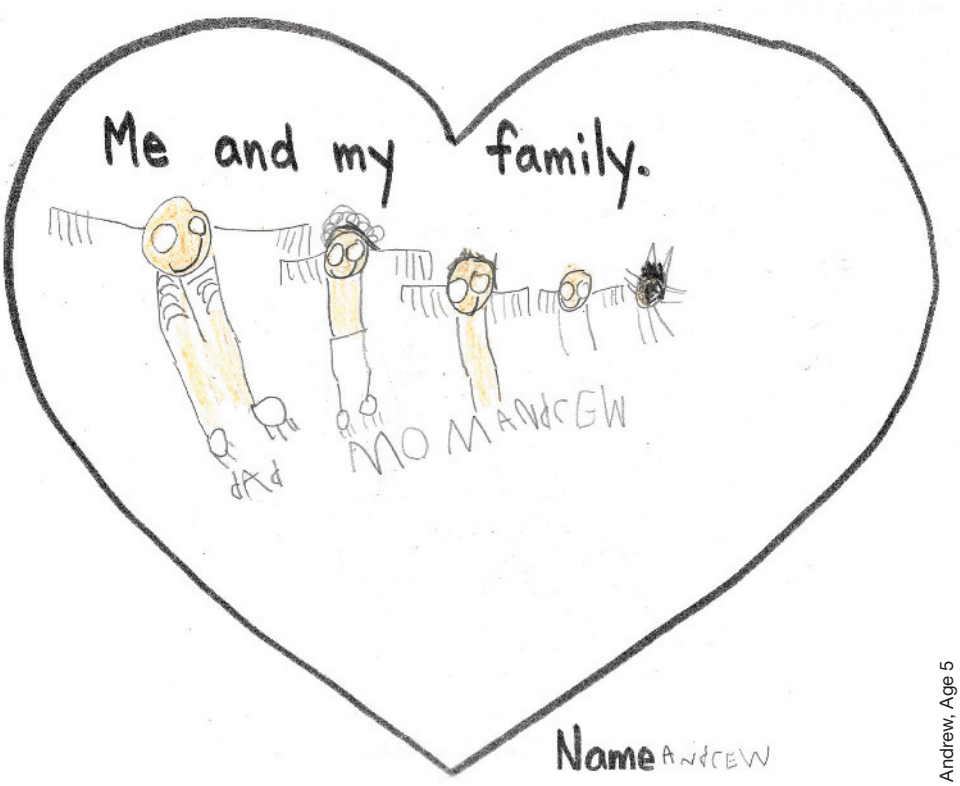
Stonewall Elementary School, Lexington, KY

When I reflect back on my own time in school—before I became a teacher—there are a few things that still stand out to me about what made some of my favorite teachers great: They just seemed to run their classrooms differently. They weren't satisfied with the mold that other teachers before them created; rather, they wanted their classrooms to feel different, to be different. They took time to tailor-make lessons and experiences just for us (based on the time that they spent with us at recess or during brief conversations in between classes). They weren't afraid to establish a relationship with their students to let them know that they care.

Trends in education often look like one teacher, school, or district copying something that they saw others do or say that they heard was successful. This could be after-school programs, a textbook curriculum, or even a piece of technology that was purchased. While this definitely doesn't mean that all of these borrowed ideas are bad for schools and students (many are great), the danger comes when schools look at others before trying to creativity figure out how best to serve their own students first. I've always placed a lot of value on the importance of teacher and student creativity, especially when a teacher's idea is grounded in sound educational practice.

Cluster 2

Who Are You? Who Are Your Students? Culture and Diversity



Andrew, Age 5

Teachers' Casebook:

Conversations About Race

What Would You Do?

A video is widely circulated on social media of an unarmed Black teenager being injured by police over the weekend in a town not far from your school. On Monday morning, as students are settling into class, you overhear a conversation about what happened. One student, whose dad is a police officer and whose backpack sports a "Blue Lives Matter" tag, remarks that what the teen was doing was wrong. Another student responds, "Well, my parents have always taught me that I'd better watch out for the police because I'm Black. Black lives matter too, don't they?" Students around the room begin to chatter. One girl sighs audibly, "Why does everything have to be about race? Can't we just agree that all lives matter?" Her comment immediately reminds you of how upset one of your colleagues became earlier this year when she found her "Black Lives Matter" bumper sticker defaced in the school parking lot. Perhaps this is a teachable moment.

Critical Thinking

- How could you use this as an opportunity to talk about race in your classroom? How would you design the classroom space for difficult conversations about race? What would be essential for you to do in order to set up the classroom for productive and courageous discursive interactions?
- If you knew that students of color were upset by White students' comments, how would you respond?
- When, if ever, is it a good idea to bring up group-based identity and the systems of privileges, advantages, and disadvantages those identities might bring with them?
- What are your fears about having conversations about race (or other social identities)?

Overview and Objectives

Who are you? How have the various facets of your cultural and social identities shaped your own experiences and views? Who are your students? How will their cultural backgrounds affect their learning, development, and motivation in your class? Nearly all aspects of educational psychology—from how brains work to how you can create a positive workflow in your classroom—are better understood when we are able to recognize the ways in which our cultural and social backgrounds have uniquely shaped who we are. The cultural composition of classrooms in the United States and around the world is constantly evolving. Frank Pajares, who was my (Ellen in this cluster) advisor in graduate school and one of the wisest educational psychologists I know, speaking at a meeting of the American Educational Research Association, observed that "the critical questions in education involve matters that cannot be settled by universal prescription. They demand attention to the cultural forces that shape our lives" (Pajares, 2000, p. 5).
I believe he is right. In this cluster, we explore the ways in which culture forms the fabric of our society.

We will start with a look inward. Understanding yourself and your own frame of reference is key to understanding others. Then we will meet two individuals whose stories bring the statistics on cultural diversity and intersectionality to life. We will consider the development of cultural-based stereotypes, prejudice, and discrimination as they affect teaching and learning. With a broad conception of culture as a basis, we then examine three dimensions of every teacher's and student's identity: social class, race/ethnicity, and gender and sexual orientation. Then we turn to a consideration of culturally responsive education, an approach to teaching that embraces diversity, and we look at ways to create culturally welcoming classrooms.

The last section presents four general principles for teaching every student. By the time you have completed this cluster, you should be able to:

2.1 Describe the meaning of culture and discuss how cultural diversity in American education today is related to learning and teaching.

2.2 Discuss what defines social class and socioeconomic status, including how SES differences relate to school achievement.

2.3 Explain how race, ethnicity, prejudice, discrimination, and stereotype threat might affect student learning and achievement in schools.

2.4 Describe the development of gender, gender identity, and sexual orientation and discuss their roles in teaching and learning.

2.5 Define multicultural education and apply research on diversity to the creation of culturally relevant classrooms.

OUTLINE

Teachers' Casebook—Conversations About Race: What Would You Do?
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Education Is Cultural
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Your Cultural and Educational History
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Cluster 2 Review
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MODULE 3 Education and Culture

Learning Objective 2.1 Describe the meaning of culture and discuss how cultural diversity in American education today is related to learning and teaching.

Education Is Cultural

Classrooms are culturally diverse places. Classrooms and schools have their own cultures, too. Throughout this text we take a broad interpretation of culture and cultural diversity. We begin with a look at the meaning of "culture." Then we invite you to explore your own cultural and educational backgrounds. This exploration will be important for how you relate not only to the rest of your studies in education but also to your future students. We will then consider social groups and identities and the cultural significance they hold. We will specifically examine social class, race, ethnicity, gender, and sexual orientation because they reflect some of the most researched social categories in education.

What Is Culture?

There are many definitions of **culture**. Most include some or all of the following: the knowledge, skills, rules, norms, practices, traditions, self-definitions, institutions (e.g., educational, legal, communal, religious, political), language, and values that shape and guide beliefs and behaviors in a particular group of people as well as the art, literature, folklore, and artifacts produced and passed down to the next generation (Banks & Banks, 2016; Cohen, 2009, 2010). Cultures have scripts—programs for living—that are communicated to members. This communication is for the most part *tacit*—understood or implied without being explicitly stated. Cultural boundaries are socially constructed and fluid. Cultural and social groups can be defined along regional, ethnic, religious, racial, gender, social class, or other lines. These lines are sometimes drawn to maintain or resist systems of power (Causadias, 2020). For example, the Black Lives Matter movement arose in resistance to a dominant culture built on the foundation of White supremacy in the United States.

Culture
The knowledge, values, attitudes, and traditions that guide the behavior of a group of people and allow them to solve the problems of living in their environment.

Each of us is a member of many groups, so we all are influenced by many different cultures. Sometimes these influences are incompatible or even contradictory. For example, if you are a feminist but also a Roman Catholic, you might have trouble reconciling the two different cultures' beliefs about the ordination of women as priests. Your personal belief will be based, in part, on how strongly you identify with each group.

Many different cultures thrive within every modern country. In the United States, students growing up in a small rural town in the Great Plains are part of a cultural group that is quite different from that of students in a large Northeastern urban center or students in a Texas suburb. Within those small towns in the Great Plains, the child of a convenience store clerk grows up in a different culture than does the child of the town doctor or dentist. Individuals of African, Asian, Hispanic, Native American, or European descent have distinctive histories and traditions even though great cultural variety exists among members of these groups. People living within a particular country may share common experiences and values, but many aspects of their lives are shaped by their different cultural affiliations and increasingly by their social networks that have no geographical boundaries. Members of different cultural groups are treated differently by the larger cultural structures within society.

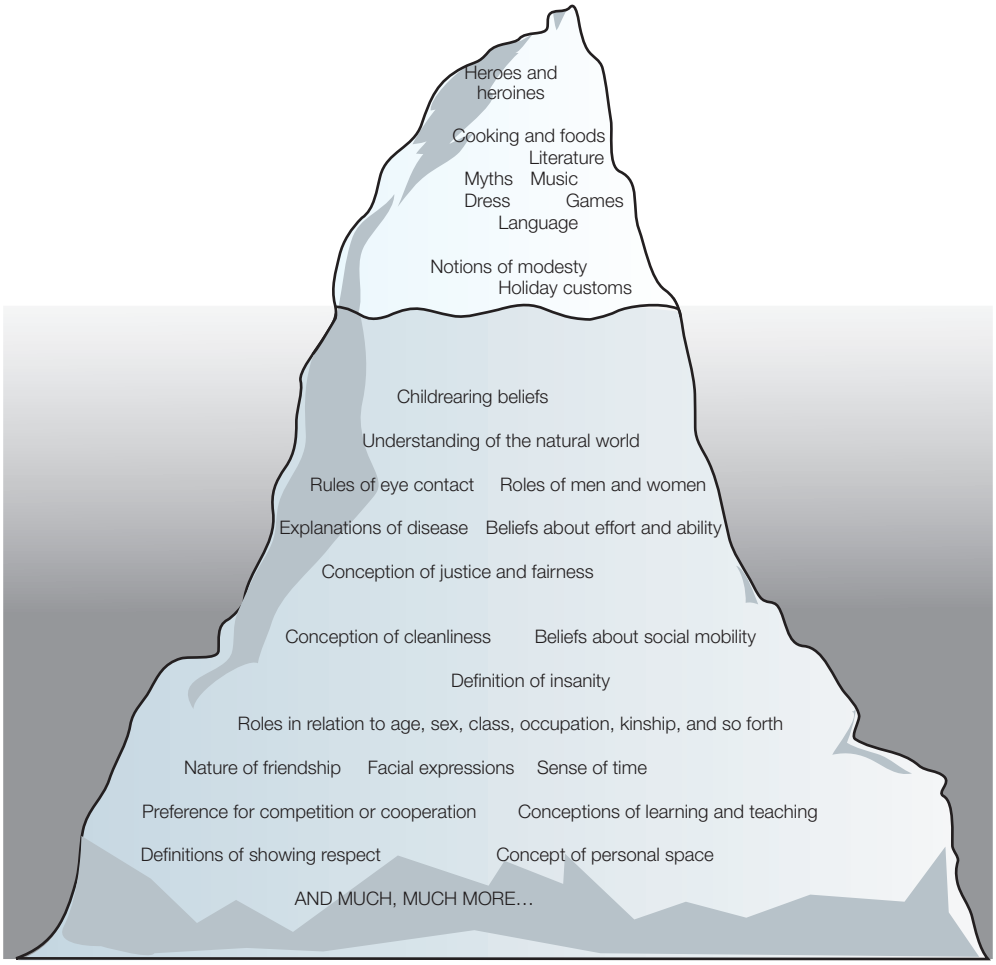
Connect and Extend to PRAXIS II®

The Larger Community (IV, B1, 3)

Familiarize yourself with the predicted changes in the U.S. population over the next several decades. How are those changes likely to affect education? What can schools and teachers do to adjust positively to those changes?

Figure 2.1 Culture as an Iceberg

Just as most of the iceberg is out of sight and below the waterline, so are most cultural differences invisible to others and even out of conscious awareness. The out-of-awareness differences are often the causes of misunderstandings and conflicts.



Culture has been compared to an iceberg. A small part of the iceberg is visible; the rest is hidden and often unknown. The visible signs of culture, such as costumes and marriage traditions, reflect only a small portion of the differences among cultures, as you can see in Figure 2.1.

Many aspects of our cultural selves exist "below the surface." Many of our cultural affiliations are not readily visible to others. In addition, your own cultural "database"—the basis for your assumptions, norms, and actions—might not be visible even to *you*. I once gave a research presentation in France and was worried when I saw that no one was nodding along as I spoke. Was it my accent? My message? I realized that cultural rules for appropriate interpersonal behaviors differ. In some groups, listeners give a slight affirmative nod of the head and perhaps an occasional "uh-huh" to indicate they are listening carefully. But members of other cultures listen without giving acknowledgment or with eyes downcast as a sign of respect. In some cultures, high-status individuals initiate conversations and ask the questions, and low-status individuals only respond. In other cultures, the pattern is reversed. These are the elements of culture beneath the surface—they are implicit, unstated beliefs about acceptable ways of thinking, being, and doing (Kahneman, 2011; Sheets, 2005). I was unaware of this culture-based expectation I held of my audience.

Cultural influences are widespread and pervasive. Some psychologists have shown that culture can determine even how a group defines intelligence (Nisbett, 2009). For example, physical grace is essential in Balinese social life, so the ability to master physical movements is a mark of intelligence in that culture. Manipulating words and numbers is important in Western

societies, so in these cultures such skills are indicators of intelligence (Gardner, 2011). Even symptoms of psychological disorders are affected by culture. In industrialized cultures where cleanliness is emphasized, people with obsessive-compulsive disorders often become obsessed with cleaning their hands, whereas in Bali, where social networks are emphasized, people with obsessive-compulsive disorders often become obsessed with knowing all the details about the lives of their friends and family—their social network (Lemelson, 2003).

Your Cultural and Educational History

To better understand educational psychology and human development, let's begin by exploring your own cultural and educational background. More than 100 years ago, father of American psychology William James, whom you met in Cluster 1, famously observed that "introspection is what we have to rely on first, foremost, and always."

Stop & Think So let's conduct a little introspective research (we might call this "me" search). Look back at your life. How would you describe your educational and cultural background? What were your formal and informal educational experiences like? Which cultural groups were you part of growing up? Which have you chosen for yourself? In what ways have you been advantaged? In what ways have you been disadvantaged? How does this affect you now?

I recently asked my undergraduate students to conduct their own autobiographical research project about their educational background (we called it a "me" search project). To help them reflect, I provided a few guiding questions (see the list in Table 2.1 on the next page). We also spent some time discussing how talking openly about our individual, social, and cultural backgrounds can be an emotionally vulnerable thing to do. I encouraged students to share with others only those details about their experiences that they felt comfortable sharing. The activity was mostly designed to help students reflect introspectively on the circumstances of their lives that contributed to who they have become.

How would you answer the questions in Table 2.1? Your own experiences and circumstances, whether you selected them or not, have shaped the way you see yourself and others. They are also part of your cultural background. Your social and educational experiences have helped you build a rich cultural "database."

As my students selected details about their educational autobiographies to share with others in the class, many used words like "normal" or "typical" to describe their schooling experiences. However, as they listened to their classmates, they were asked to write down at least one aspect of each classmate's cultural or educational experience that was different from their own. Here are a few of the distinctions my students noticed as they listened to one another:

- "He is from a big family and did not move, which is the opposite of my small, fractured family and many moves."
- "She was raised in an affluent community outside of Chicago—she had more opportunities for growth than I had. My dad drank our money away."
- "I never went to a predominantly White school like he did."
- "I grew up with no ethnic minority students in my school system. I missed out on a valuable learning experience."
- "She went to an all-girls high school, which was probably a very difficult experience."
- "He has lived in three different states throughout his life, and I've never left Kentucky. My family has lived in the same house since my parents got married."
- "She became super close friends with one of her teachers, which I wouldn't have even imagined possible in my experience."
- "Christian farm life must be so different from my non-Christian suburban life. I have never even been on a farm before."

Table 2.1 Your Educational Autobiography

REFLECTIVE QUESTIONS
• What was your family's educational background? What was your household income? Whom have you lived with?
• How would you describe your parents' social class and status?
• Where have you lived? How would you describe your home(s) and neighborhood(s)? Where have you traveled?
• What were the values, norms, and expectations in your home?
• What learning tools (e.g., books, computers, games, people) were available to you at school and at home?
• What were your formal schooling experiences like? What kinds of schools did you attend? What kinds of classes were you in (or not in)? How did you feel at school?
• What were your informal learning experiences (e.g., faith groups, sports, travel, music, camps, work) like?
• How were your teachers? Who or what has been your most influential teacher?
• How would you describe your peers and classmates?
• What was the most typical aspect of your education? What was most atypical?
• In what areas do you feel less educated than you would like to be? Why?
• How have you felt different from others? When, where, and by whom did you feel most and least accepted?
• How much trust did you feel in people in your community (e.g., peers, teachers, neighbors)?
• How would you describe your own cultural background? How has it affected you?
• How were you as a learner? Where has learning been easiest? Where has it been most difficult?
• How would you describe your academic motivation?
• How has your educational experience influenced what you want out of life?
• What social or cultural events, ceremonies, or rituals did you take part in?
• How would you describe the health (e.g., physical, psychological) of your family members?
• Who were the members of the "in" and "out" groups in your schools and communities? Which were you in?
• How would you describe your interactions with members of other racial groups?
• Were you a part of any social group for which you had to qualify?
• Were you a member of any selective groups (e.g., girls only, advanced students, special education, varsity athletics)?
• Did you have financial or social resources that gave you additional educational opportunities?
• Do you or does someone close to you (a) speak more than one language, (b) play a musical instrument, (c) participate in a civic organization, (d) have a private tutor, (e) read extensively, or (f) have an advanced degree?
• How much choice did you or your parents have in where you went to school, what classes you were in, and who your teachers were?
• What resources (e.g., books, transportation, high-speed Internet, family members who attended college, a trusted adult confidant, a personal bank account, a job opportunity, a private tutor) were available to you?
• What was your relationship to the natural environment? How often did you spend time outdoors?
• What job(s) have you held? How and why did you get those job(s)? What have they taught you?
• In what capacity have you had to work with others toward a common goal?
• Where have you felt that the doors to opportunity were open to you? Where have the doors felt closed to you? Why?
• What did you learn, whether directly or indirectly, about groups of people who were different from you?

- "He had advanced musical opportunities from a pretty young age. He has been very well trained by world-class musicians."
- "Being from a poorer area and school district shaped her educational experience. Unlike me, she learned more from her informal education than from her formal education due to the low funding."

What did you notice? I hope you can see that no single educational or cultural experience exists. We can all find commonalities and differences. Becoming more aware of your own social and cultural upbringings and those of others will help you become a more culturally conscious teacher. This awareness will increase the likelihood that you honor cultural differences when you plan your instruction. Later in this cluster, we will provide specific examples of ways you can do this.

For now, let's meet two students who provide a more in-depth look at cultural diversity.

Meet Two Students

In Cluster 1, you read some statistics about students in America and saw that classrooms are becoming more diverse. But teachers do not work with statistics; they work with students—unique individuals. In this section, Nancy Knapp from the University of Georgia invites us to meet two individuals. These students are not specific people; they are composites of the characteristics of real people Nancy has known and taught. The names and schools are fictional, but the descriptions of these students' lives are very real.

Ternice Mattox is a seventh-grader who lives with her mother and three younger siblings in a large city in the Northeast. Her mother works the 7:00 to 3:00 shift at a dry-cleaning plant and then cleans offices some nights and weekends to make ends meet, so Ternice gets her brothers and sister up and ready for school every day, feeds them dinner when they get home, and makes sure they do their homework at night; she has been doing this since she was 10.

School hasn't ever been very hard for Ternice. In elementary school she usually got B's, but she never really liked school until sixth grade, when her English teacher "let you write about whatever you wanted, even your own life; and she didn't count off for every mistake right away, but let you work with her and with the other kids until you had a final copy you could be really proud of." Ternice found out that she really enjoyed writing and was good at it, too. She talked so much in English class that Anthony Bailey criticized her about "actin' so White." Ternice got mad; it really bothered her. She and Anthony kind of "talk," and she likes him a lot. Her teacher wants her to take some tests to see whether she can get into the program for students with gifts and talents, but Ternice is not so sure. Even if she got in, she's afraid she wouldn't know anyone; almost all the kids in "gifted" are White, and the few Black kids are from another part of town. Besides, her friends, especially Anthony, might not like it. Her mama wants her to try and says there's no telling where she can go from there, but Ternice doesn't want to go anywhere that's away from all her friends. Still, she wishes she could have more classes like her English class last year.

Jessie Kinkaid is a junior at Red Falls High School in Wisconsin. She lives with her mother, who works as a doctor's receptionist, in a small house in town. Her father lives just outside town with his second wife and Jessie's 3-year-old half-brother, so she sees him pretty often.

Jessie is in the vocational track at school and mostly makes Cs with a few Ds. Once in a while, she fails a course, but she'll have enough credits to graduate by the end of next year, which is all she really cares about. Her family and consumer sciences teacher says she has a real flair for cooking and wants Jessie to bring up her grades so that she can apply to chef's school. Jessie likes to cook and knows she's good at it, but she doesn't see any point in getting more schooling. She's graduating only to please her parents; she knows what she's going to do with her life. After graduation she's going to get a job in town somewhere for a couple years to save up some money, and then she'll marry Walter Aiken. She and Walt have been dating since she was a freshman and he was a junior. Walt started this year at UW–Platteville to get a degree in animal science, and they plan to wait until he is finished before they get married. Then they'll move into the small house on the Aikens' farm until Walt's dad is ready to retire, probably in another 3 or 4 years. Then Walt will take over the farm, and they'll move into the large farm house; Jessie hopes they'll have at least one child by then.

So Jessie doesn't see any point in worrying about her grades, as long as they're good enough for her to graduate. Her father agrees that it would be foolish to waste time and money on extra schooling she'll never use. Jessie's mother, who left school at 17 to marry, is the one urging Jessie to think about continuing her education. She says she just wants Jessie to "keep all her options open."

Ternice and Jessie are just two students, and there are millions more—unique collections of abilities and experiences. They use different vocabularies, have different ethnic and racial backgrounds, and live in different kinds of communities. Some come from families in poverty, others from families with power and privilege—but all face challenges in their education. For the remainder of the cluster, we look at several dimensions of cultural differences in schools today.

Cultural Intersections and Terminology

As we discuss cultural differences, we need to keep several important points and terms in mind. First, we will focus sections of this cluster, on social class, ethnicity, race, gender, and sexual orientation because much of the available research has focused on these categories. Of course, real people are not just African American or middle class or male; they are complex beings and members of many groups, just like Ternice and Jessie, the two students you just met.

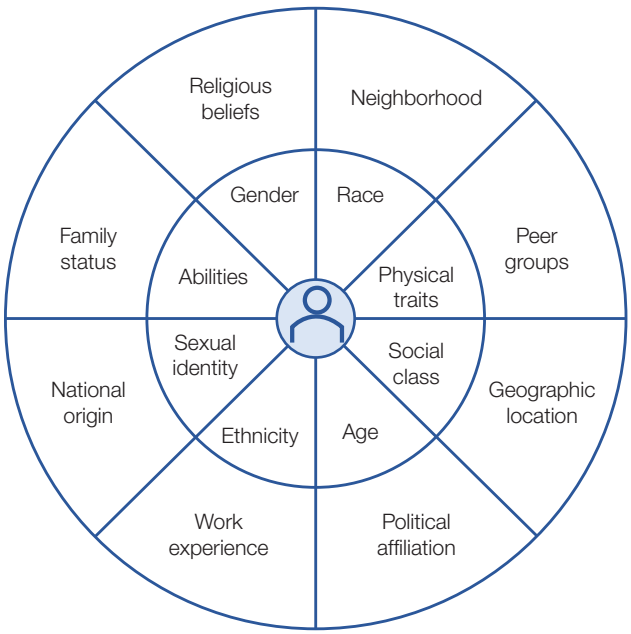
Intersectionality
Our overlapping, intersecting social identities (gender, sexual orientation, class, ethnicity, religion, socioeconomic status, age, etc.) that shape each and every one of us in unique ways.

Stop & Think Stop here for a moment and think of three to five groups (gender, sexual orientation, class, ethnicity, religion, socioeconomic status, age, etc.) to which *you* belong. You might use the identity wheel pictured in Figure 2.2 to help. How do the intersections of your memberships influence your interactions with others? How might your own cultural heritage and chosen cultural affiliations affect how you see yourself and what you do? What have been the major advantages of your group affiliations or social identities? What, if any, disadvantages have you experienced?

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Cultural and Gender Differences in the Classroom (III, B)
What are the sources of possible miscommunication among students and teachers in the classroom because of cultural or gender differences? Identify steps a teacher can take to minimize such problems.

INTERSECTIONALITY. The fact that you belong to many social groups results in a fascinating tapestry of cultural intersectionality. **Intersectionality** refers to our overlapping, intersecting social identities (gender, sexual orientation, class, ethnicity, religion, socioeconomic status, age, etc.) that shape each of us in unique ways (Rosenthal, 2016). Individuals who are members of multiple social groups that have been disempowered by others can experience additional psychological, educational, and health risks. As Audre Lorde, an African American author who dedicated her career to confronting racism, sexism, homophobia, and classism, once said, "There is no such thing as a single-issue struggle because we do not live single-issue lives" (Lorde, 1982). For example, students who are in gender and sexual minority groups are at greater risk of homelessness, and this risk increases if they are also members of an ethnic minority group (Tierney & Ward, 2017). As you read on, think of your own examples of how such cultural intersectionalities might influence learning and teaching.

Figure 2.2 Cultural Identity Wheel
People belong to many cultural and social groups. How would you describe yourself in each category? Which of these groups is most important to you? Which do you think about most often?



Source: Image created by Ellen Usher.

Intersectionality also means that knowing that a person is a member of a particular cultural group does not define what that person is like. As you just saw, you belong to many social and cultural groups—some visible and some invisible. Even members of the same cultural group can have widely different behaviors. This means that we must resist the tendency to predict or explain a person's behavior from their membership in a particular group. The reasons for human behavior are much too complicated! Consider, for example, how many explanations there might be for why a student in your class consistently arrives late. It might be that the student has a job before school, must walk a long distance, or, like Ternice, is responsible for getting younger siblings to school. Maybe the student dreads school. Why, then, do we use these cultural categories to label people at all?

CULTURAL GROUPS AND TERMINOLOGY. The identity wheel in Figure 2.2 offers some broad categories behind which are many more terms people use to describe their cultural affiliations and social group memberships. As we will explore throughout the book, language is a powerful cultural tool. Behind the words we use are concepts that have been socially agreed upon, sometimes through force and domination. For example, the concept of "nationality" has often been decided based on who conquered a given territory or people. Similarly, the concept of "race" has been redefined over centuries using an assortment of arbitrarily selected physical features, including skin pigmentation.

Neuroscientist Lisa Feldman Barrett (2020) observed that we tend to "treat the labeled boxes as if they're part of nature when in fact we build them.... We, as a culture, choose the features of discrimination and draw dividing lines that magnify the differences between the group we call 'us' and the group we call 'them'" (pp. 121–122).

When labels are used in ways that show an inclination toward or against members of a certain group, the label is considered biased and can cause harm. Consider how children might feel when the term "illegal alien" (versus "immigrant" or "refugee") is used to describe them. As an educator, you should strive to use bias-free language. This can be challenging because language is dynamic and fluid, changing over time and among groups. Also, the labels that in-group members use to describe themselves might differ from those used by out-group members. For example, "Latinx" has been used increasingly as a gender-inclusive alternative to "Latino" or "Latina" to refer to people in the United States with ethnic roots in Latin America or Spain. However, a recent study found that only 25% of Hispanic-identifying people had heard of the term and only 3% actually use it (Noe-Bustamante et al., 2020). How should you determine which labels to use? What will you teach your students about labels?

There is no set of rigid rules for the "correct" terms to use. However, some terms are considered oppressive or obsolete and are therefore always unacceptable. The American Psychological Association has published guidelines for bias-free language. One overarching recommendation is that it is best "to use the terms that individuals and/or communities use to describe themselves, their experiences, and their practices" (APA, 2019, p. 131). However, if the terms that people use to describe themselves are considered stigmatizing, it is best to avoid using them. Remember that language holds great power. When in doubt, respect people's humanity. We will all make mistakes, but we can apologize and use the more appropriate term next time. In this book, we will make linguistic decisions as responsibly as we can, knowing that some readers will prefer that we had used different terminology and that language is always evolving. You can read more specific recommendations about language related to race, ethnicity, gender, socioeconomic status, disability, and sexual orientation here: https://apastyle.apa.org/style-grammar-guidelines/bias-free-language.

Stereotypes, Prejudice, and Discrimination

Now that you have explored your own cultural background and reflected on the many intersecting cultural groups to which you belong, let's look at how you have learned to understand people in social and cultural groups similar to and different from your own. We will specifically examine the human tendency to categorize people and things and what can happen when those categorizations become too rigid and lead to cultural conflicts, prejudice, and discrimination. Understanding this process will help you develop more culturally supportive practices and support your students' social development.

STEREOTYPES: THE GOOD AND THE BAD. The social and cultural information that your mind has been sifting through during your lifetime—your "database"—permits you to quickly categorize things, people, and places according to the common features that you have learned about them. As you will learn in later clusters, your mind works more efficiently by grouping things together based on their common features rather than by treating things individually. We develop schemas—organized bodies of knowledge—about objects, events, and actions.

Stop & Think List three traits most characteristic of:

College freshmen
Politicians
Athletes
Buddhists
Members of the National Rifle Association

Stereotype
A widely held, often oversimplified, schema that organizes knowledge or perceptions about a category.

From a very young age, we also form schemas, or **stereotypes**, about groups of people. For the *Stop & Think* activity on the previous page, your mind consulted your experiential database to help furnish you with a list of several traits most characteristic of college freshmen, politicians, athletes, Buddhists, and members of the National Rifle Association. That list would reveal your stereotypes about each group. These stereotypes organize what you know, believe, and feel about the group.

Nothing is inherently wrong with stereotyping. Throughout your life, your mind has been busy gathering and categorizing data to help you understand the world around you and make predictions about what will happen. Stereotypes are based on your own social and cultural experiences. This includes your exposure to media such as television, films, books, and the Internet. You passively consume a lot of information each day and are not always aware of the massive number of implicit associations your brain is making along the way (Greenwald & Lai, 2020). Anytime you encounter a new situation—even as you read the words in this textbook—your mind will refer back to your own experiences to help you make sense of it. This is a natural starting place. But what if some of that information is incomplete or, worse, inaccurate or biased?

You probably also know that stereotypes can be problematic. One reason for this is that stereotypes are oversimplified (e.g., all Californians are relaxed). Another is that stereotypes are based on limited data (I will not meet every Californian or learn everything about each one of them). Even seemingly positive stereotypes can lead to problems. For example, Asians and Asian Americans have been stereotyped as "model minority" students—quiet, hardworking, passive students who universally succeed (Yi et al., 2020). These stereotypes can reinforce conformity and stifle assertiveness. They also set up harmful social comparisons between Asian-heritage students and students of other ethnicities. Stacey Lee and her colleagues have described another stereotype confronting Asian Americans: They are seen as perpetual foreigners (Lee et al., 2017). No matter how many decades their families have lived in America, even fourth- or fifth-generation Asian American students might not be perceived as "real" Americans (J. Lee & Zhou, 2015). In fact, researchers have shown that teachers tend to refer to these students as "Asian," not as "Asian American" or "American." Too often, students who are the target of teachers' cultural stereotypes take them to heart and feel pressured, burdened, or even invisible.

FROM STEREOTYPES TO PREJUDICE. When people think stereotypically about social groups, they tend to make evaluations about two group characteristics: *warmth* (Are members of this group friendly? Trustworthy?) and *competence* (Are people in this group capable? Assertive?). For example, older adults are often stereotyped as high in warmth but low in assertiveness. How would you rate each group in the previous *Stop & Think* activity on these two dimensions? According to psychologist Susan Fiske (2018), your evaluation of social groups leads you hold certain feelings toward people within them. For instance, people admire those whom they judge to be high in warmth and competence, but they feel pity or contempt for those who lack these qualities. Research has shown that these feelings about a group (e.g., admiration, contempt, pity) can quickly give way to **prejudice**—rigid and unfair generalizations about an entire category of people. For example, you are prejudiced against people who are overweight if you think they are lazy, feel disgusted when you see them, and refuse to date them (Aboud et al., 2012). Likewise, **bias** refers to a prejudicial preference or action.

Prejudice
Prejudgment or irrational generalization about an entire category of people.

Bias
A prejudicial preference or action.

Like stereotypes, prejudice and bias can be positive or negative; that is, you can have positive as well as negative irrational beliefs about a group. They can be directed toward individuals of any group categorization, such as race, ethnicity, religion, politics, age, geographic location, language, sexual orientation, gender, ability, or appearance. How do our prejudices develop?

Prejudice starts early. Humans have a tendency to divide the social world into two categories: us and them, or the in-group and the out-group. We tend to see members of

the out-group as inferior to and different from us but similar to each other—"they all look alike." Even in infancy, children are more likely to accept a toy from people familiar to them (Rhodes & Baron, 2019). Results from studies around the world show that prejudice based on ethnic group membership begins by age 4 or 5 (Aboud et al., 2012; Anzures et al., 2013). In-group and out-group prejudices might be based on race, religion, gender, age, ethnicity, sexual orientation, or even athletic team membership.

Another source of prejudice is that people tend to make favorable attributions to themselves and less favorable attributions to others, thus assuming their own superiority. For example, people who have more (money, social status, prestige) might justify their privilege by claiming it was earned entirely by their individual efforts and skills. This can lead to blaming the victims: People who live in poverty or women who are raped are seen as causing their problems by their behaviors—"they got what they deserved." What follows can be the myth of meritocracy—the idea that all people are on equal playing fields and that success is just a matter of working hard. This overlooks the many unearned advantages or disadvantages people have by virtue of their life circumstances, such as when or where they were born. Emotions play a part as well. When things go wrong, we look for someone or some whole group to blame. For example, after the global coronavirus outbreak, some people vented their anger by attacking innocent Asian Americans (Lee & Waters, 2021).

But prejudice is more than a tendency to form in-groups, a self-justification, or an emotional reaction—prejudice is also the product of a large storehouse of information and values that we gather throughout our lives. Children learn both explicitly and implicitly about traits and characteristics that are (or are not) valued by their families, peers, and teachers and by the broader world around them. The media also perpetuates stereotypical messages about who is (and is not) successful. For years, the "powerful" and "smart" characters presented in books, films, television, and advertising were European Americans and men. People of different ethnic and racial backgrounds were seldom the "heroes" (Ward, 2004). This is changing. In 2020, the United States elected its first African American, southeast Asian American, and female Vice President; its first female Secretary of the Treasury; and its first African American Secretary of Defense.

Even so, seeing historically oppressed groups acknowledged favorably by the media is not a given. Negative portrayals in the media of women, racial minorities, and certain religious minority groups have been amplified in some media outlets in recent years and by some elected officials. The Southern Poverty Law Center reported a surge in White nationalism, hate speech, racism, and far-right extremism during the 2016 and 2020 presidential campaigns (see Costello, 2016, https://www.splcenter.org). How does this affect young learners and, particularly, those in minoritized groups?

STEREOTYPE THREAT. When learners feel that they must constantly monitor the environment for possible stereotypes and prejudice, their academic performance can be undermined—a concept referred to as stereotype threat. The term **stereotype threat** refers to an "apprehensiveness about confirming a stereotype" (Aronson, 2002, p. 282). The basic idea is that when individuals are in situations in which a stereotype applies, they bear extra emotional and cognitive burdens—the possibilities of confirming the stereotype, either in the eyes of others or in their own eyes. So, when girls are asked to solve complicated mathematics problems or when African Americans take the SATs, for example, they are at risk of confirming widely held stereotypes that girls are inferior to boys in mathematics or that African Americans score lower on the SATs than do other ethnic groups. Believing the stereotype is not necessary: All that matters is that the individual is aware of the stereotype and cares about performing well enough to disprove its unflattering implications.

Stereotype threat
The emotional and cognitive burdens that can result from heightened awareness that your performance in an academic situation might confirm a stereotype that others hold about you.

Steven Spencer and his colleagues (2016) pointed out that "every individual is potentially vulnerable to stereotype threat, because every individual has at least one social

identity that is targeted by a negative stereotype in some given situation" (p. 415). The impact seems to be worse for learners who strongly identify with the group or activity under threat ("I am proud to be African American," "Science is really important to me!") (Appel & Kronberger, 2012; Huguet & Régner, 2007). For example, studies have shown that stereotype threat has worsened the performance of students from lower-SES backgrounds, older adult test takers, elite athletes, White male college students who were very strong in mathematics but were told that Asian students performed much better on a particular test, and school-age boys who believed they were inferior to girls (Hartley & Sutton, 2013; Spencer et al., 2016).

How, exactly, does the threat of confirming a stereotype affect learners? Experiencing a psychological threat can (a) prevent individuals from performing at their best on tests and assignments; (b) interfere with attention, working memory, and learning in the subject (e.g., math); and (c) decrease connections to and valuing of that subject (Spencer et al., 2016). Thus, stereotype threat might be one cause, but not the sole cause, of performance differences between some groups (Nadler & Clark, 2011). Students who experience stereotype threat are less likely to feel a sense of belonging and connection in the context where the threat is "in the air." When they feel disconnected, motivation and engagement suffer (Thoman et al., 2013). They might lose interest, develop self-defeating strategies to avoid looking stupid, or feel anxious in testing situations. (Read more about these in Cluster 12.) Experiencing persistent threats can lead to negative, long-term consequences such as withdrawal of effort or even dropping out of school. As soon as students psychologically disengage from school, they are unlikely to exert the effort needed for real learning. One way that teachers can help reduce these effects is by developing a curriculum that provides rich counterevidence to stereotypical messages and by affirming students in their diverse identities (Spencer et al., 2016).

FROM PREJUDICE TO DISCRIMINATION. As we have seen, prejudice consists of rigid, irrational *beliefs* and *feelings* (usually negative) about an entire category of people. The third element of prejudice is a tendency to *act*, called discrimination. **Discrimination** refers to unequal treatment of particular groups of people. Clearly, many Americans face prejudice and discrimination in subtle or blatant ways every day. Mistreatment of unarmed Black men by the police is an example of discrimination with life-and-death consequences. However, ample evidence of discrimination can be found in childhood and adolescence, from the playground to the classroom to the principal's office.

Discrimination
Treating unfairly or acting unfairly toward particular categories of people.

Although prejudice and discrimination come from many places—peers, media, social encounters outside of school—evidence suggests that perceiving discrimination from a teacher may be the most damaging for educational outcomes (Benner & Graham, 2013). As noted earlier, teachers are often unaware of their prejudices. Yet these prejudices can affect teachers' expectations for their students and how they interpret students' behaviors.

In her book *Discrimination in Childhood and Adolescence*, psychologist Christia Brown (2017) shows that even young children are highly attuned to whether they are welcomed and included by others at school. Perceiving that one is being unfairly treated can have negative psychological, physical, academic, and social consequences in both the short and the long terms. Feeling undervalued, overlooked, or excluded makes staying focused and motivated at school difficult. In addition, being the target of others' prejudices and discrimination can lead learners to feel that they must constantly monitor the environment for further prejudice and discrimination, causing immense stress and undermining academic achievement.

In the sections that follow, we will look more closely at how members of different cultural groups experience school. Specifically, we focus on economic and social class, ethnicity and race, gender and sexual identities, and how learners' experiences are related to learning, development, and motivation. We will also share evidence about how group-based stereotypes, prejudice, and discrimination can alter learners' self-beliefs, motivation, emotions, and learning.

Module 3 Summary

Education Is Cultural (pp. 37–39)

What is culture, and how does cultural diversity affect learning and teaching? There are many conceptions of culture, but most include the knowledge, skills, rules, traditions, beliefs, and values that guide behavior in a particular group of people: Culture is a program for living. The differences between cultures might be very obvious, tip-of-the-iceberg characteristics, or they might be very subtle, below-the-surface differences. When subtle cultural differences meet, misunderstandings and conflicts are common. These conflicts can happen when the values and competencies of the dominant, mainstream culture are used to determine what is considered "normal" or appropriate behavior in schools. In these cases, children who have been socialized in different cultures might be perceived as acting inappropriately, not following the rules, or being rude and disrespectful.

Your Cultural and Educational History (pp. 39–43)

Why is it important to understand your own cultural background? Everyone is a member of many cultural groups, defined in terms of geographic region, nationality, ethnicity, race, gender, social class, and religion. Membership in a particular group does not determine behavior or values but makes certain values and kinds of behaviors more likely. Wide variations exist within each group. You met two individuals, Ternice and Jessie, who embody that diversity.

What terms should I use when describing my own and others' cultures? Examining the different social groups to which we belong can serve to guide the terms we use. However, labels that show a prejudicial evaluation for or against a group should be avoided. When in doubt, use the terms that individuals in the group would prefer you to use when describing their group and its practices. Remember that intersectionality refers to the overlapping cultural identities that people have. These might shape individuals in unique ways that no single group would have done.

Stereotypes, Prejudice, and Discrimination (pp. 43–46)

What are the differences among prejudice, discrimination, and stereotype threat? Prejudice is a rigid and unfair generalization—a prejudgment or attitude—about an entire category of people. Prejudice might target people in particular racial, ethnic, religious, political, geographic, or language groups, or it might be directed toward the gender or sexual orientation of an individual. Discrimination is unequal treatment of or actions toward particular categories of people. Stereotype threat is the extra emotional and cognitive burden that your performance in an academic situation might confirm a stereotype that others hold about you. It is not necessary that the individual even believe the stereotype. All that matters is that the individual is aware of the stereotype and cares about performing well enough to disprove its unflattering implications. In the short run, the fear that you might confirm a negative stereotype can induce test anxiety and undermine performance. Over time, experiencing stereotype threat might lead to disidentification with schooling and academic achievement.

MODULE 4 Social and Diversity Economic

Learning Objective 2.2 Discuss what defines social class and socioeconomic status, including how SES differences relate to school achievement.

Economic and Social Class Differences

Even though most researchers would agree that social class is one of the most meaningful cultural dimensions in people's lives, those same researchers have great difficulty defining *social class* (Liu et al., 2004; Macionis, 2019). Different terms are used—*social class, socioeconomic status, economic background, wealth, poverty, capital*, and *privilege*. Some people consider only

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Economic Conditions/Socioeconomic Status (SES) (IV, B2)

Be aware of the possible effects of SES on student achievement. Consider what steps teachers can take to minimize those effects.

economic differences; others add considerations of power, influence, mobility, educational attainment, occupational status, control over resources, access to opportunities, and prestige.

Social Class and Socioeconomic Status

Most researchers identify five general social class distinctions in U.S. society: upper, upper middle, middle, working, and lower classes. The main characteristics of these five groups in the United States are summarized in Table 2.2. These are rough approximations; people's lived experiences might not fall neatly within these categorical lines. Across the past five decades, the number of American adults living in middle-income households has steadily decreased as the number of wealthy and poor households in America has increased (Horowitz et al., 2020a). The richest 5% of families in the United States have seen the most rapid growth in wealth. The trends reflect growing income inequality in the United States, which outpaces that of other countries.

Socioeconomic status (SES)
Relative standing in a society based on income, power, background, and prestige.

Another way to assess people's standing in society commonly used in research by sociologists and psychologists is by combining variations in wealth, power, control over resources, and prestige into an index called **socioeconomic status (SES)**. SES is usually ascribed to people by researchers; different formulas for determining SES might lead to different categorizations (Macionis, 2019; Sirin, 2005). No single variable, not even income, is an effective measure of SES. Rather, SES refers to a composite ranking of these various measures of social inequality.

You might be thinking that your own social standing does not fit into any of these rigid categories. One reason is that levels of wealth, power, and prestige are not always consistent. Some people—for instance, university professors—are members of professions that are reasonably high in terms of social status and prestige but that provide considerably less wealth or power (believe me). Other people have political power even though they are not wealthy, or they might be members of the elite social register in a town even though their family money is long gone.

Table 2.2 Selected Characteristics of Different Social Class Memberships

	UPPER CLASS	UPPER MIDDLE CLASS	MIDDLE CLASS	WORKING CLASS	LOWER CLASS
Percentage of U.S. population	5%	40–45%		33%	20%
Income	$239,000 to billions	$134,000–$238,000	$55,000–$134,000	$30,000–$55,000	Below $27,000
Occupation/Source of Money	Family money, "old money," investments, CEO	Corporate, professional, income earned in some way	White-collar, skilled blue-collar	Blue-collar	Minimum wage, unskilled labor
Education	Home-schooled, tutors, prestigious private schools and colleges	Prestigious colleges and graduate schools	High school, college, or professional school	High school; about 20% go to college	High school
Home Ownership	Several homes, private jets for transportation	At least one home	Usually own home	About half own a home	About 40% own a home
Health Coverage	Full	Full	Usually	Limited	Uncommon
Neighborhoods	The most exclusive	Exclusive or comfortable	Comfortable	Modest	Deteriorating, least desirable areas
Afford Children's College	Easily	Usually	Seldom	Rarely	Uncommon
Political Power	National (perhaps international), state, local	National, state, local	State or local	Limited	No

Note: All descriptions are rough categorizations. Many exceptions can occur within each category according to individuals and context. For example, income markers differ by number in household and geographic region. In very expensive areas such as San Francisco, it may take at least $150,000 for a family of three to be in the lower middle class.

Source: Information from Macionis, J. J. (2019). *Sociology* (17th ed.). Pearson; Gorski, P. (2013). *Reaching and teaching students in poverty: Strategies for erasing the opportunity gap.* Teachers College Press.

Most people are generally aware of their social class; that is, they perceive that some groups are above them in the social class hierarchy and some are below (Diemer et al., 2013). In fact, people quickly evaluate small social cues (e.g., physical appearance, language, behaviors) to determine what social class others are in relative to them (Kraus et al., 2017). These subjective evaluations, in turn, guide people's beliefs, behaviors, and well-being, thereby reinforcing actual social class boundaries.

Students (and teachers) may even show a kind of "classism" (like racism or sexism), believing that they are superior to members of lower social classes and avoiding association with them. For example, Marissa, a member of the most popular and privileged clique in her high school, described the "grits"—the least popular group—as follows:

> Grits are poor. I think they mostly live in the country. We—[quickly correcting herself] some of my friends call them hicks or rednecks. I guess most live on the Hill—that's over on the west side of town. It's the slums. Grits smoke, do drugs, dress grungy. They have those hick accents. They usually get bad grades. They don't like school so I think they drop out a lot. They don't really fit in. They are troublemakers. I don't see them much; they aren't in any of my classes. (Brantlinger, 2004, pp. 109–110)

Author Isabel Wilkerson would say that Marissa is describing a "caste" system of social hierarchy in the United States (Wilkerson, 2020). "Caste" is defined as the "invisible structure that created and maintains hierarchy and inequality" based on our many intersectional cultural group memberships, including class, wealth, power, race, gender, immigration status, and other cultural identities (pp. 69–70). This invisible structure becomes reinforced in our policies, structures, and habitual ways of thinking. A caste "affix[es] people to certain roles based upon what they look like and what they historically have been assigned to or the characteristics and stereotypes by which they have been categorized" (p. 71).

Poverty and Social Inequality

Experiencing poverty can amplify other disadvantages related to a person's social standing. In 2019, about 14.5% of Americans under the age of 18 lived below the federal poverty line of a $26,172 annual income for a family of four (Semega et al., 2020). If we add children living in low-income families (earning about $48,000 for a family of four), then 44% of all children in the United States lived in low-income or poor families, and 30 million students qualified to receive free or reduced-price lunches at school in 2016 (Jiang et al., 2016; U.S. Department of Agriculture, 2016).

The absolute number of children living in poverty is similar for non-Hispanic White children (3.2 million), Latino children (4.4 million), and African American children (3.0 million). However, these numbers are misleading. The *rate* of poverty is much higher for African American, Latino, and Native American children—30% of African American and 24% of Latino children lived in poverty in 2018, whereas 11% of Asian and 9% of non-Hispanic White children were poor (Children's Defense Fund, 2020). Contrary to many stereotypes, the *absolute number* of poor children living in rural and suburban areas is greater than that in central cities. But poverty *rates* are high in urban schools.

Childhood poverty rates declined steadily during the period of economic expansion in the United States between 2010 and 2020 (Semega et al., 2020); however, the COVID-19 pandemic is exacerbating social and economic inequalities, which are worse for Latino, African American, and indigenous children and families (Bauer et al., 2020; Benner & Mistry, 2020). Even before the pandemic, wealth gaps between the upper class and other income groups in the United States had been widening over the previous two decades; White households are approximately 10 times wealthier than Black households and 8 times wealthier than Hispanic households (Killewald et al., 2017). Discriminatory practices (e.g., lending practices, segregation, school districting) and institutionalized racism continue to put African Americans at a disadvantage when it comes to accumulating wealth.

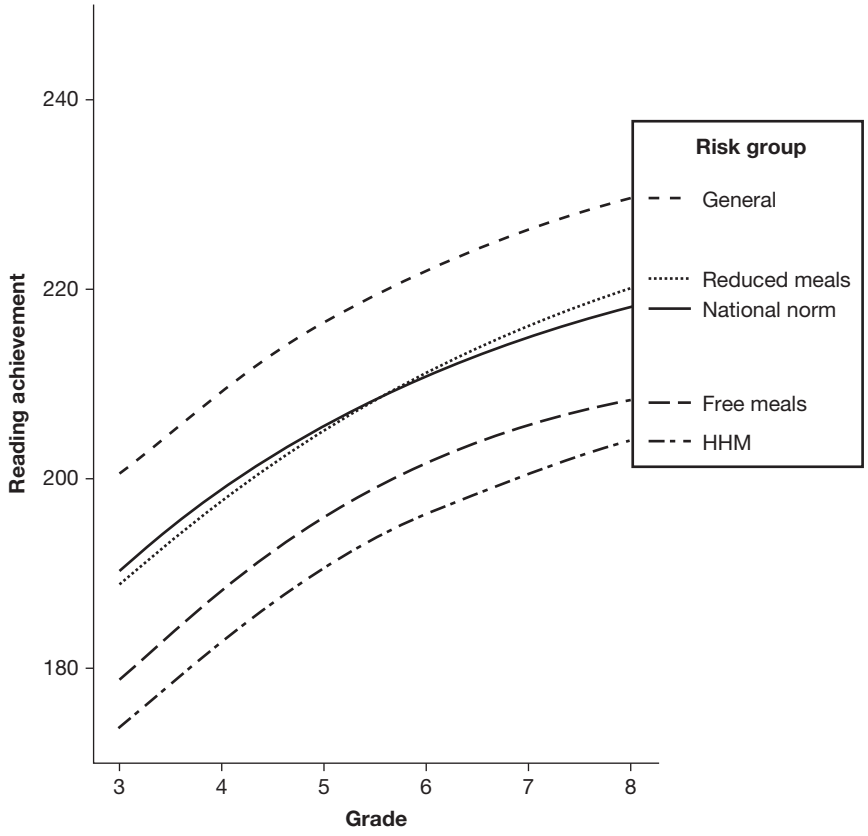
Poverty and Academic Outcomes

Living in poverty can affect learners' development and academic outcomes. The average correlation between SES and achievement tests is moderate, about .30 to .40 (Sackett et al., 2009; Sirin, 2005). In general, students of all ethnic groups with high SES show higher average levels of achievement on test scores and stay in school longer than students with low SES, and this difference widens with the student's age, from 7 to 15 (Cutuli et al., 2013). And the longer the child is in poverty, the stronger the impact is on achievement. For example, even when we take into account parents' education, the chance that children will be held back in school or placed in special education classes increases by 2% to 3% for every year the children live in poverty (Ackerman et al., 2004).

Figure 2.3 shows the trends in reading achievement from third through eighth grade for students in several income risk groups (homeless/highly mobile, free lunch, reduced-cost lunch) compared both to the national average for those grades and to students who were never a part of any of these risk groups (labeled "general" in the figure). You can see that the growth rates are similar but that these groups begin at different levels in third grade. This is one reason that early interventions (preschool and primary school) are especially important for students placed at risk.

One troubling trend is that the educational inequalities are growing between children from privileged families (income at the 90th percentile) and children from poor families (income at the 10th percentile). These inequalities were *30% to 40% greater* for children born

Figure 2.3 Trends in Reading Achievement from Third Through Eighth Grade for Students in Several Income Risk Groups



Note: General = students who were never a part of any of the risk groups; HHM = homeless/highly mobile.

Source: Cutuli, J. J., Desjardins, C. D., Herbers, J. E., Long, J. D., Heistad, D., Chan, C-K, Hinz, E., & Masten, A. S. (2013). Academic achievement trajectories of homeless and highly mobile students: Resilience in the context of chronic and acute risk. *Child Development, 84*, p. 851. Reproduced with permission of John Wiley & Sons, Inc.

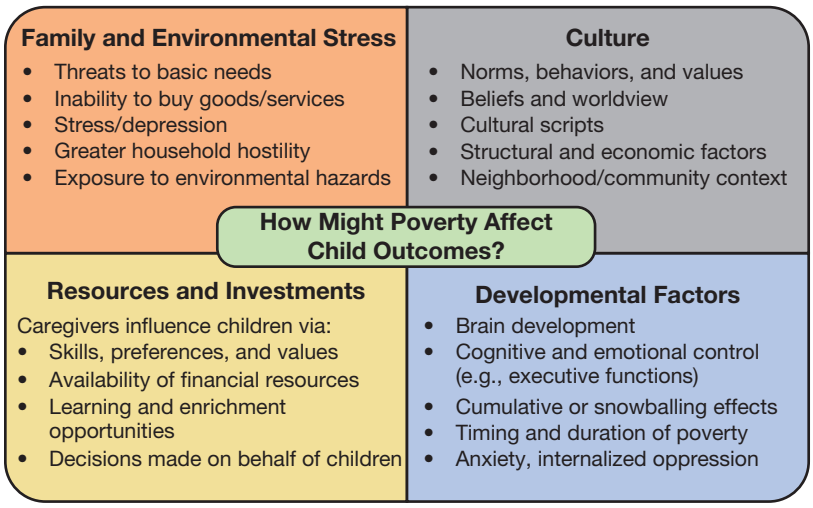
in 2001 compared to children born in 1976. These increasingly dramatic income differences between the wealthy and the poor have led to greater segregation of low-income children in lower-quality schools. Economic resources available to wealthy children allow them to reap tremendous advantages from informal learning opportunities, such as travel, specialized summer camps, and tutoring services—resources that poor families can't afford (Berliner, 2013; Reardon, 2011). This has led some researchers to refer to differences in the educational performances of rich and poor students as an "opportunity gap" rather than an achievement gap (Gorski, 2013; Milner, 2010, 2015).

When it comes to the effects of poverty on academic achievement, however, it is important to remember that correlation is not causation. In fact, determining how and why poverty affects children's performance can be challenging. Researchers have studied many related factors, such as family and environmental stress, availability of resources, the types of educational investments parents make, school and neighborhood characteristics, and cultural beliefs and expectations (Diemer et al., 2020; Duncan et al., 2017). Figure 2.4 provides some examples; others include poor health care, dangerous home environments, interruptions in schooling, and exposure to violence, overcrowding, homelessness, and discrimination. In turn, academic difficulties can lead to low-paying jobs—and another generation born into poverty. Numerous scholars have offered other possible explanations (Ehrlich, 2020; Gorski, 2013; Jensen, 2016). Let's take a closer look at some of them.

HEALTH, ENVIRONMENT, AND STRESS. The negative effects of poverty begin even before a child is born. Families in poverty have less access to good prenatal and infant health care and nutrition. More than half of all adolescent mothers receive no prenatal care at all. Poor mothers and adolescent mothers are more likely to have premature babies, and prematurity is associated with many cognitive and learning problems. Children in poverty are more likely to be exposed to both legal drugs (nicotine, alcohol) and illegal drugs (cocaine, heroin) before birth. Children whose mothers take drugs during pregnancy can have problems with organization, attention, and language skills.

Poor children are four times as likely to experience chronic stress due to evictions, lack of food, overcrowding, or utility disconnections. Increased stress is related to increased school absences, decreased attention span and concentration ability, problems with memory and thinking, reduced motivation and effort, increased depression, and reduced neurogenesis (growth of new brain cells) (Blair & Raver, 2016; Evans & Kim,

Figure 2.4 Mechanisms by Which Poverty Affects Children's Educational Outcomes



Source: Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2017). Moving beyond correlations in assessing the consequences of poverty. *Annual Review of Psychology, 68*(1), 413–434.

2013; Jensen, 2013). In the early years, children in poverty experience higher levels of stress hormones than do children in middle-class and wealthy families. High levels of these hormones can interfere with the flow of blood in the brain, decrease the development of synaptic connections, and deplete the body's supply of tryptophan, an amino acid that calms impulsive and violent behaviors (Hudley & Novak, 2007). As they grow, poor children breathe more polluted air and drink more contaminated water—recall the scandal surrounding the water in Flint, Michigan. Poor children are at least twice as likely as non-poor children to have lead poisoning, which is associated with lower school achievement and long-term neurological impairment (Evans, 2004). Economically disadvantaged children and particularly those who also experience maltreatment or discrimination are at increased risk of obesity, high blood pressure, and other inflammatory diseases (Boyce et al., 2021). Exposure to these and other environmental stressors during critical periods of development can affect many aspects of neurological, cognitive, and emotional development (Hyde et al., 2020).

LOW EXPECTATIONS—LOW ACADEMIC SELF-CONCEPT. Poor students are also at risk of being stigmatized by their teachers and peers. For example, students from homes with limited resources might wear older clothes or be less familiar with certain books and school activities. Their teachers and other students might in turn believe that these students are not bright. The teacher might avoid calling on them, assuming they don't know the answer, set lower standards, place them in lower-ability groups, and accept poor work. Even without awareness, teachers and peers can send social "signals" that relay a message to students lower in socioeconomic standing that they are less valued (Piff et al., 2018). Thus, low expectations become institutionalized, and the educational resources provided to these children are minimal and inadequate (Borman & Overman, 2004). Low expectations, along with a lower-quality educational experience, can lead children to internalize others' negative evaluations and develop a sense of learned helplessness, described in Cluster 12 (Ruck et al., 2019). Students with low SES, particularly those who also encounter racial discrimination, might decide that school is a dead end. Without a high school diploma, these students find few rewards awaiting them in the work world. Many available jobs barely pay a living wage. In his 2015 book *Rac(e)ing to Class*, Richard Milner describes the ways in which the intersection of poverty and race has led to chronic inequalities in the educational opportunities of poor students of color.

PEER INFLUENCES AND RESISTANCE CULTURES. Students who attend schools where most of their peers are from middle- and high-income families are 68% more likely to attend college compared to students in schools where most of the students are from low-income homes. Even after controlling for many possible causes, Gregory Palardy (2013) concluded that peer influences are the strongest predictors of this difference in college attendance. Students in high-poverty schools are much less likely to have friends who plan to attend college and much more likely to have friends who drop out of school.

Resistance culture
Group values and beliefs about refusing to adopt the behaviors and attitudes of the majority culture.

Some researchers have suggested that certain students from low-SES backgrounds might cope with the inequities around them by becoming part of a **resistance culture**. To members of this culture, making it in school means selling out and trying to act "middle class." To maintain their identity and their status within the group, these students might cope by rejecting the behaviors that would make them succeed in school—studying, cooperating with teachers, and even coming to class (Bennett, 2011; Ogbu, 1987, 1997). This is an understandable reaction from students who might view such attempts as futile in an oppressive or discriminatory system (Cokley et al., 2011). John Ogbu linked identification with a resistance culture to poor Latino American, Native American, and African American groups, but similar reactions have been noted for poor White students both in the United States and in England and also in high school students in Papua New Guinea (Woolfolk Hoy et al., 2002).

This is not to say that all or even most students with low SES resist achievement. Many young people are high achievers in spite of either their economic situation or negative peer influences (O'Connor, 1997). And we should not forget that some aspects of schooling—competitive grading, public reprimands, stressful testing and assignments, and repetitive work that is too hard or too easy—can (and probably should) encourage resistance in all students (Okagaki, 2001). Focusing solely on students' resistance (or their lack of resilience) is a way of blaming students for their lower achievement; instead, educators should focus on making school an inclusive place that does not invite resistance from anyone (Stinson, 2006). One way to do this is by realizing how our own cultural backgrounds, socialization, and rigid stereotypes "might hinder our abilities to connect with low-income families, or any families, in the most authentic, open way" (Gorski, 2013, p. 59). In Gorski's words, educators need to become "equity literate."

HOME ENVIRONMENT AND RESOURCES. Families in poverty seldom have access to high-quality preschool care for their young children—the kind of care that enhances cognitive and social development (Duncan & Brooks-Gunn, 2000; Vandell, 2004). Poor children read less and spend more time watching television; they have less access to books, computers, the Internet, libraries, and trips—opportunity gaps again (Kim & Guryan, 2010). Even the ways in which parents talk with their children can vary by SES (Rowe, 2018). Again, these are averages and do not apply to all low-income families. Many families provide rich learning environments for their children and help them develop considerable strengths by coping with adversity (Frankenhuis & Nettle, 2020). When parents of any SES level support and encourage their children—by reading to them, providing books and cognitively stimulating toys, taking the children to the library, making time and space for learning—the children tend to become better, more enthusiastic readers (Cooper et al., 2010). Home and neighborhood resources seem to have the greatest impact on children's achievement when school is not in session.

SUMMER SETBACKS AND SCHOOL DISRUPTIONS. Children in poverty begin school about 6 months behind in reading skills compared to those from wealthier homes, but the skill difference between the groups grows to almost 3 years by sixth grade. This gap in reading skills between students in poverty and middle-class students has been increasing since the early 1970s. One explanation for this growing gap is that the children from poorer homes, and especially those whose first language in not English, lose ground over the summer, when school is not in session. Even though both groups make comparable achievement gains during the school year, every summer vacation creates about a 3-month reading achievement gap between poor and advantaged children (Kim & Guryan, 2010; Kim & Quinn, 2013). One study suggested that the four summer vacations between second and sixth grade accounted for 80% of the achievement differences between poor and advantaged students (Allington & McGill-Frazen, 2003, 2008). This truly is a case of the rich getting richer. Wealthier children have greater access to books all the time but especially over the summer. They read more, and the more children read, the better readers they become—volume of reading matters. The good news is that quality summer reading programs for low-income families and their children can be effective in helping students improve their reading skills (Kim & Quinn, 2013).

The COVID-19 pandemic has widened the economic and opportunity gaps between students whose families face economic hardships and those who are financially stable. One immediately apparent gap emerged when schools closed to in-person instruction and instructional delivery moved online. Suddenly the classroom became the living room, bedroom, or kitchen. Resources available in most school districts, such as reliable access to learning materials, regular meal service, and transportation, were disrupted. Many families—including some teachers—lack sufficient resources, technological equipment, and access to Internet connectivity to participate in high-quality remote instruction. In some school districts, students have been alternating between remote and in-person learning

for many months, with no clear end in sight. In schools that have been unable to deliver online instruction to some or all students, teachers have been doing their best to get materials to students to learn at home. Student absenteeism is at an all-time high; by one estimate, 3 million U.S. students did not attend school in 2020–2021 (Korman et al., 2020). Scholars have projected that students will experience disproportionate learning loss as a function of their SES and prior achievement levels (Kuhfield et al., 2020). Stories abound about the ways in which the pandemic has highlighted and exacerbated economic inequalities and opportunity gaps. These gaps are worse for ethnic minority students, English language learners, students with disabilities, and students experiencing homelessness.

TRACKING AND POOR TEACHING. A final explanation for the lower achievement of many students who live in low-SES environments is that these students are more often placed in lower academic *tracks*, and they are therefore actually taught differently (Oakes, 2005). If they are tracked into "low-ability," "general," "practical," or "vocational" classes, they might be taught to memorize and to learn more passively than their more advantaged peers. Middle-class students are more likely to be encouraged to think and be creative in their classes.

Even if they are not tracked, students from low-income families are more likely to attend schools with inadequate resources and less effective teachers (Evans, 2004; Goldhaber et al., 2018). For example, in high-poverty schools, more than 50% of math teachers and more than 60% of science teachers are inexperienced or teaching outside their subject area expertise; they were not trained for the subjects they are teaching (Jensen, 2009). When students with low SES receive a substandard education, this gives them inferior academic skills and limits their life chances, beginning with not preparing them for higher education (Knapp & Woolverton, 2003). Having effective teachers improves students' short- and long-term learning, school attendance, and graduation rates.

Extreme Poverty: Homeless and Highly Mobile Students

According to the National Center for Children in Poverty, nearly 10% of U.S. children who are 9 years old and younger live in *deep poverty*—their family income is less than half of the federal poverty line (Nguyen et al., 2020). When families live in extreme poverty, they sometimes lack even a stable home. In the 2018–2019 school year, nearly 1.4 million students were homeless in the United States (National Center for Homeless Education, 2021). That represents about 2.7% of all enrolled students. Those experiencing homelessness in adolescence were more likely Black, Hispanic, lesbian, gay, bisexual, or transgender, partly because of increased exposure to victimization and abuse (Morton et al., 2018; Tierney & Ward, 2017). Students who are homeless or who move very often are at additional risk of a range of physical and mental health problems and social and learning difficulties (Herbers et al., 2020). For example, even after taking many other risk factors and income levels into account, researchers found that students who moved three or more times during a school year were 60% more likely to repeat a grade (Cutuli et al., 2013). According to the National Center on Family Homelessness, 75% of elementary students and 85% of high school students who were homeless performed below grade level in reading and math. Homelessness and high mobility contribute to chronic risks and problems in school, problems that are difficult to overcome.

Even with such risks, many of these students are resilient. Cutuli and his colleagues (2013) analyzed the math and reading test scores of more than 26,000 students from third through eighth grades and found that 45% of the homeless and highly mobile students achieved in the average-or-better range across time in spite of their challenges. The researchers concluded that factors such as effective parenting, student self-regulation skills (see Cluster 11), academic motivation (see Cluster 12), and the quality of teaching and teachers' relationships with students (see this whole book) support resiliency for these students. The early years in school are particularly important. Homeless students who develop reading and self-regulation skills in the early grades are more likely to be successful throughout school (Buckner, 2012). For more ideas about quality teaching for students who live in poverty, see the *Guidelines: Teaching Students Who Live in Poverty* on the next page.

GUIDELINES

Teaching Students Who Live in Poverty

Educate yourself about the effects of poverty on student learning.

Examples

1. Read articles from good journals.
2. Seek diverse sources to inform you. For example:
   a. Eric Jensen's (2013) *Engaging Students with Poverty in Mind: Practical Strategies for Raising Achievement*
   b. Paul Gorski's (2013) *Reaching and Teaching Students in Poverty: Strategies for Erasing the Opportunity Gap*

Set and maintain high expectations for all students.

Examples

1. Guard against feeling sorry for students, excusing poor work, and expecting less. Replace pity with empathy based on solid knowledge of your students.
2. Communicate to students that they can improve and succeed with good effort.
3. Engage higher-order thinking skills that validate students' intellectual capacities.
4. Provide constructive criticism because you believe your students can do quality work.
5. Add challenging subjects and Advanced Placement classes.

Develop caring relationships with your students (see the 2015 Center for Promise report "Don't Quit on Me").

Examples

1. Use inclusive language—"our class," "our projects," "our school," "our efforts."
2. Talk to students outside class. Make a point to identify their interests and abilities.
3. Attend sports or other events in which your students participate.
4. Create a class Welcome Center for families (see Cluster 6).
5. Help a student connect with a mentor, tutor, and/or coach.

Build learning and self-regulation skills as part of the curriculum.

Examples

1. Teach students how to organize work, focus attention, or seek appropriate help.
2. Include conflict management and social problem-solving skills in lessons.

Notice health problems.

Examples

1. Notice who seems to be absent or tardy often.
2. Check to see whether some students struggle to hear the class discussions. Can they see from the back of the room?
3. Model healthy eating and physical activity.

Assess student knowledge; start where they are, but don't stay there (Milner, 2010).

Examples

1. Use short, ungraded assessments that target the learning objectives for each unit.
2. Differentiate instruction based on results (see Cluster 14).

Source: Jensen, E. (2013). *Engaging students with poverty in mind: Practical strategies for raising achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.; Gorski, P. (2013). *Reaching and teaching students in poverty: Strategies for erasing the opportunity gap.* New York, NY: Teachers College Press; Center for Promise. (2015). Don't quit on me: What young people who left school say about the power of relationships. Washington, DC: America's Promise Alliance.

Module 4 Summary

Economic and Social Class Differences (pp. 47–55)

What is SES, and how does it differ from social class? Social class reflects a group's prestige and power in a society. Most people are aware of the social class that they share with similar peers. Sociologists use the term *SES* for variations in wealth, power, control over resources, and prestige. Socioeconomic status is determined by several factors—not just income—and often overpowers other cultural differences. No single variable is an effective measure of SES, but most researchers identify four general levels of SES: upper, middle, working, and lower classes. The main characteristics of these different SES levels are summarized in Table 2.2.

What is the relationship between SES and school achievement? Socioeconomic status and academic achievement are moderately correlated. Students of all ethnic groups with high SES show higher average levels of achievement on test scores and stay in school longer than students with low SES. The longer the child is in poverty, the stronger the impact is on achievement. Why is there a correlation between SES and school achievement? Students with low SES might experience inadequate health care, teachers' lowered expectations of them, low self-esteem, learned helplessness, participation in resistance cultures, school tracking, understimulating home environments, and summer setbacks. This last, striking finding is that children with low SES lose academic ground outside school over the summer, whereas children with higher SES continue to advance.

MODULE 5 Ethnic and Racial Diversity

Learning Objective 2.3 Explain how race, ethnicity, prejudice, discrimination, and stereotype threat might affect student learning and achievement in schools.

Ethnicity and Race in Teaching and Learning

The United States truly is a diverse society. The National Center for Education Statistics projects that by fall 2029, more than half of the school-age population will be African American, Asian, Latino/a, or from other ethnic groups (National Center for Education Statistics, 2020). Before we look at the research on ethnicity and race in school settings, let's understand how people come to understand their own and others' ethnic and racial group membership.

Defining Ethnicity and Race

Ethnicity
A cultural heritage shared by a group of people.

Race
A socially constructed category based on appearances and ancestry.

Ethnicity usually refers to a group's shared, common cultural characteristics such as history, homeland, language, traditions, or religion. We all have some ethnic heritage, whether our background is Italian, Ukrainian, Hmong, Chinese, Japanese, Navajo, Hawaiian, Puerto Rican, Cuban, Hungarian, German, African, or Irish—to name only a few. **Race** is defined as a socially constructed category of people who share certain physical characteristics (e.g., skin color or hair texture) that members of a society have considered important (Macionis, 2019). There are no biologically pure races. For any two humans chosen at random, an average of only 0.012% (about one-hundredth of 1%) of the alphabetic sequence of their genetic codes is different due to race (Myers, 2005).

Both ethnicity and race are therefore primarily social constructions that gain meaning within particular social or political contexts (Lee & Bean, 2010). At the individual level, they become part of our identity—how we understand ourselves and interact with others. At the group level, both ethnicity and race are often institutionally imposed labels involving educational, economic, political, and power structures (Macionis, 2019). In this book we use the labels *ethnicity*, *race*, or *race/ethnicity* based on which label seems most appropriate to the findings being discussed.

Sociologists sometimes use the term *minority group* to label a group of people that receives unequal or discriminatory treatment. But this practice of referring to *people* as

minorities because of their racial or ethnic heritage has been criticized because doing so is misleading and has negative historical connotations (APA, 2019; Milner, 2010). For example, in certain places such as Chicago and Mississippi, African Americans are in the numeric majority, and European Americans are in the numeric minority. Unless otherwise specified, when we refer to *ethnic minority groups*, we do so using the entire U.S. population as a reference group. We often use the terms *White*, *Black*, and *Latino* instead of *European American*, *African American*, and *Hispanic*, respectively, because the former terms are more inclusive of students with diverse national origins (e.g., Canada, Haiti, or the Dominican Republic) and various immigration statuses. As we noted earlier in the cluster, teachers should be mindful of their own use of these terms when addressing their students' racial/ethnic heritages. (For more information on terminology, see Christia Brown's 2017 book about students' perceptions of discrimination and the link to the APA's guidelines for reducing bias provided earlier.)

Ethnic and Racial Identity

At some point during their development, young people begin to understand themselves as members of racial and ethnic groups. Young children often make little or no distinction between their own race and their ethnic identity—the two are inextricably intertwined. Moreover, although a group may share an ethnicity, its members can include people of different races or vice versa. Therefore, researchers have suggested that terms such as *racial-ethnic-cultural identity* may be more appropriate when attempting to accurately represent the psychological experiences of young people (Umaña-Taylor et al., 2014). **Ethnic-racial identity** generally refers to how people think and feel about their own ethnic and racial groups and the significance and meaning they ascribe to them (Seaton et al., 2018; Umaña-Taylor et al., 2014). Identity evaluations might include how important or central one's ethnicity or race is to their life, how group members see themselves (private regard) or perceive others seeing them (public regard), or a sense of pride (see Rivas-Drake et al., 2014). Children may begin with an unexamined racial or ethnic identity, either because they have not explored at all or because they have accepted the identity labels that have been encouraged by others around them. European American adolescents are less likely to have examined their own ethnic-racial identity given their membership, particularly if most of their experiences have put them in the numeric majority. Early adolescents who have ethnically diverse friends engage in their own ethnic-racial identity exploration, which is an important part of healthy identity development (Rivas-Drake et al., 2017). You will learn more about identity development processes in Cluster 4.

Ethnic-racial identity
The beliefs, feelings, significance, and meaning people have about their ethnicity or race.

MULTIDIMENSIONAL AND FLEXIBLE ETHNIC IDENTITIES. At the beginning of this cluster, you explored your own complex cultural identity. How would you describe your ethnic and racial identity? For many students in the United States, ethnic-racial identity is multidimensional and intersects with other identities such as nationality (Parker et al., 2015). For example, a Pew Research Center survey revealed that two thirds of Hispanic adults consider their Hispanic background to be part of their racial background. However, when asked for their race on the U.S. Census, many Hispanic adults identify more with the country or region of their ancestors (Cuba, Mexico, the Dominican Republic, the Caribbean, etc.) than with a general notion of Hispanic or Latino. Others highlight different aspects of their racial identities, such as their African heritage or Caribbean roots (Noe-Bustamante et al., 2020).

Members of other ethnic and cultural groups respond in similar ways. Adolescents in immigrant or refugee families might be more motivated to identify strongly with their nationality or origin—for instance, with their Chinese, Syrian, Japanese, Filipino, Vietnamese, or Moroccan heritage in certain situations; in other situations, they might identify with their new country or with broader ethnic groups such as Asian or Black (Seaton et al., 2018; Verkuyten, 2016). Similarly, students from indigenous communities might view their tribal identity as central in some contexts but identify with colonial (i.e., White) norms in others (Galliher et al., 2017; Jones & Galliher, 2015). Determining an ethnic-racial identity may be even more complicated for biracial or multiracial adolescents. The parent they live with, the makeup of their neighborhood, their appearance, and their experiences of discrimination or support can influence how these adolescents identify themselves. Some psychologists think that these challenges help

multiracial youth develop stronger and more complex identities, but other psychologists argue that the challenges present an extra burden in an already-tough process (Herman, 2004; Ritchey, 2015). Perhaps the outcome depends in part on the support adolescents receive when facing the challenges. One thing is certain: The complexity of identity makes clear how limiting labels can be, particularly labels that are imposed by others who have more power.

Teachers should understand that their students might be navigating multiple cultures and identities (Fuligni & Tsai, 2015). Incorporating instructional strategies that encourage students to reflect on their own and others' ethnic-racial identities can offer needed support (Branch, 2020). Perhaps the best advice is to try to understand that many of your students will be constructing complex identities that allow them to move in and out of several cultures and languages. Get to know the individual students and respect their growing identities by creating an "identity-safe" learning environment (Spencer et al., 2016).

RACIAL IDENTITY DEVELOPMENT. Richard Milner (2003, 2015) has pointed to the importance of racial identity development and awareness, especially in teaching. To reckon with how we and our students have come to understand ourselves and others as members of different races is helpful for moving toward more racially just and equitable education. The process of racial identity development is also helpful for understanding people's race-related beliefs, behaviors, and experiences. Let's examine one model that has focused on Black racial identity development.

William Cross (1991; Cross & Cross, 2007; Cross et al., 2012) devised a framework that specifically addresses African American racial identity and consciousness—that is, the process of becoming Black. The process, which he called **nigrescence**, has five stages:

Nigrescence
The process of developing a Black racial identity.

- *Pre-Encounter:* At this stage, Cross says that an African American's attitude might range from ignoring race to feeling neutral about race and to actually being anti-Black. African Americans at this stage might adopt certain beliefs of White Americans, including the tendency to see "Whiteness" as superior. Some level of self-hate is a possible consequence. At the pre-encounter stage, people value other aspects of their identities, such as religion, profession, or social status.
- *Encounter:* This stage is often triggered by encounters with overt, covert, or institutional racism. For instance, when an African American is followed around in an upscale store, is assaulted by police, or sees news reports about such assaults, then his or her eyes are opened to the reality that race matters in society. The individual becomes attuned to their Blackness.
- *Immersion/Emersion:* Cross sees this stage as a transition—an in-between state that might cause people to be anxious about "becoming the 'right kind' of Black person" (Cross, 1991, p. 202). In response to encounters with discrimination, the individuals fill their lives with symbols of Blackness; they buy books about Black experiences and socialize mainly with other African Americans, for example. They are eager to understand their racial heritage more deeply.
- *Internalization:* Individuals are firmly connected to and secure in their sense of racial identity. They don't worry about what friends or outsiders think—they are confident in their own standards of Blackness.
- *Internalization-Commitment:* This stage is very closely connected with internalization. The main difference is an individual's continued interest in and commitment to Black affairs. Such individuals chart their lives to connect to their Black racial identity; for example, a painter might dedicate his life to painting images of Black life or a researcher might dedicate her life to studying the educational experiences of African Americans.

No single model describes identity development for all members of a race group living in United States. For example, the stages in the nigrescence model might not be appropriate for understanding the identity development of first-generation, U.S.-born African students or for students with both a Latino and a Black heritage such as that of some Dominican Americans (DeWalt, 2013).

Similar racial identity development models have been explored for individuals of other racial backgrounds. For example, Janet Helms (1995, 2014) put forth a model describing stages of White identity development. White people have historically held power over

Table 2.3 Privileges Often Afforded by Being White in America

ARE YOU ABLE TO ...
• Browse leisurely in a store without being watched closely by an employee?
• Congregate in public spaces with other members of your race without being perceived as threatening?
• Observe more positive than negative portrayals of your race group in the media?
• Experience failures in work or school without fearing that people will attribute them to your race?
• Take classes on just about any topic that are taught by people who look like you?
• Choose health care professionals who are members of your race?
• Share the same race with most of your immediate colleagues and high-level leaders in your field?
• Call the police when a crime has been committed without fear that your race will affect how you will be treated?
• Walk around in your residential community without being asked if you really live there?
• Go to any salon or barbershop and find someone who can appropriately style and care for your hair?
• Go through your daily life without fear of being viewed as "out of place" because of your race?
• Offer your opinions without an expectation that they reflect the views of your entire racial group?
• Be an expert or highly skilled in something without it being attributed to your race?
• Find numerous books and films that feature lead characters who look like you?
• Receive an education that will highlight the traditions and accomplishments of people of your race?
• Interact with others without being asked what country you are from?

Source: Statements created with input from Jennifer Burris, Xiao-Yin Chen, Anastacia Cole, Candice Hargons, and Jaylene Patterson.

indigenous people and people of color in the United States. Consequently, their healthy identity development requires, in part, that they come to terms with this history and the unearned privileges that Whiteness has given them (Helms, 2020). Whitney Dow, a filmmaker and founder of "The Whiteness Project," recalled being asked by a seventh-grade student what he had learned about his own racial identity after working on the project with his African American collaborator, Marco Williams: "It was like suddenly getting x-ray glasses.... [I realized that] the most day-to-day manifestation of my White privilege is not being forced to think about the fact that I am White. I think that for most people who aren't White, they don't have that luxury" (PBS, 2017). Some White people have difficulty recognizing the privileges and affordances of being born White. Table 2.3 provides a list that may be helpful in understanding some of these advantages.

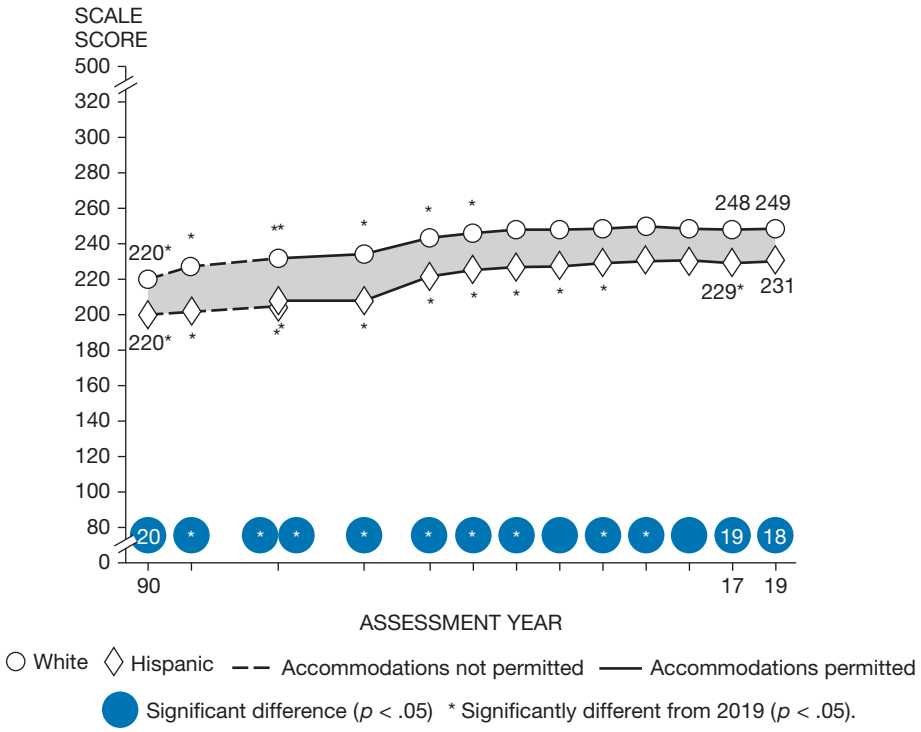
For Black individuals and members of other racial and ethnic minority groups who have been historically oppressed or marginalized in the United States, having strong positive feelings about one's own group seems to be important for good mental health as well as for engagement and success in school (Cook & Cook, 2014; Steinberg, 2005). How central or salient people's race is to how they view themselves might also be related to how they handle discrimination (Brown, 2017). Ultimately, the importance of your racial identity depends on several contextual factors. For example, researchers studied the effect of the sociopolitical context of the Black Lives Matter movement on children's racial identity development between 2014 and 2016. Black and multiracial children who were interviewed at each time point reported that their racial identity had become more important to them, whereas White children did not (Rogers et al., 2021). Parents, peers, and media also affect children's developing racial identities (Huguley et al., 2019; Williams et al., 2020). Teachers who understand the complexity of students' racial identity development and expose students to diverse social models who have developed their own healthy racial identities are better able to support their students' healthy development (DeCuir-Gunby, 2009; Spencer et al., 2016).

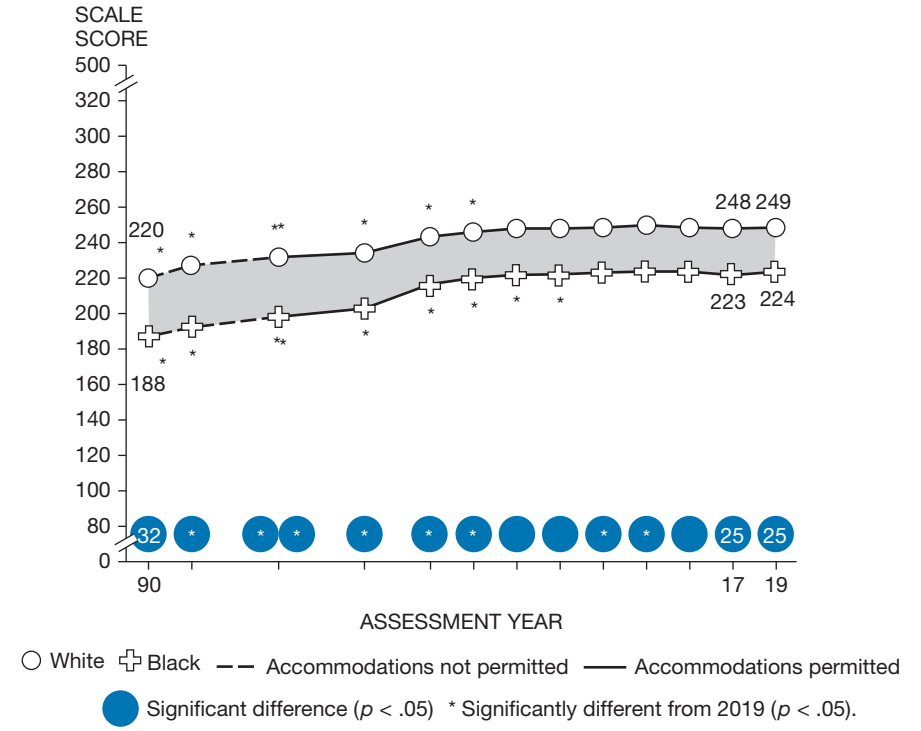
Ethnic and Racial Differences in School Achievement

A major concern in schools is that some ethnic groups consistently achieve below the average for all students (Matthews et al., 2010; Uline & Johnson, 2005). This pattern of results tends to hold for all standardized achievement tests, but the gaps have been narrowing since about the 1980s and are smaller than the gaps seen between wealthy and poor students (Raudenbush, 2009; Reardon, 2011). For example, as you can see in Figure 2.5, on

Figure 2.5 Scores on the National Assessment of Educational Progress in Fourth-Grade Mathematics

The following figures show the math achievement scores of American fourth-graders between 1990 and 2019. The top figure compares White and Hispanic students. The bottom figure compares White and African American students.





Note: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. Score gaps are calculated based on differences between unrounded average scores.

Source: U.S. Department of Education, 2019 National Assessment of Educational Progress (NAEP) Report Card: Mathematics. Retrieved from https://www.nationsreportcard.gov/mathematics/nation/groups/?grade=4.

the National Assessment of Educational Progress in mathematics, the gap between scores of White and Black fourth-graders has narrowed from 34 points in 1996 to 25 points in 2019 (U.S. Department of Education, 2019). The gap between White and Hispanic fourth-graders has narrowed from 25 in 1996 to 18 in 2019. These gaps are larger in eighth grade (32-point gap between White and Black students; 24-point gap between White and Hispanic students). Asian and Pacific Islander students scored the highest in math at both grade levels.

Proponents of this notion of an "achievement gap" have been criticized for taking a narrow view and assuming that the scores of White, middle-class students are the norm that all other students must be compared to and measured by (Anyon, 2012) or that students who are underperforming are somehow to blame for their inadequacies (Zirkel & Pollack, 2016). Milner (2013, 2015) suggests that we think about other kinds of "gaps" such as teacher education and quality gaps, challenging curriculum gaps, affordable housing and health care gaps, school integration and funding gaps, and quality childcare gaps, digital divide gaps, wealth and income gaps, and employment gaps—all culminating in *opportunity gaps* for many students of color. For example, a case analysis of one high school in Berkeley, California, showed that school staff implemented science learning labs before and after school to decrease achievement gaps between White students and African American and Latino students. These opportunity structures were not actually equally accessible to all students and ended up *widening* rather than *narrowing* the learning gap between students (Zirkel & Pollack, 2016).

Gloria Ladson Billings (2006) described the *educational debt* (based on decades of underinvestment and discrimination) that we owe students of color and students living in poverty. Other educational psychologists have pointed out that students of color often experience a discrepancy between their own needs and the opportunity structures provided by schools, which can result in a decreased sense of school belonging, academic motivation, and, in turn, performance (Gray et al., 2018).

Opportunity gaps and educational debts lead to education completion gaps. Across the United States in 2018, about 89% of White students graduated from high school, compared to 79% of African American students, 81% of Hispanic students, 92% of Asian/Pacific Islander students, and 74% of American Indian and Alaska Native students (Hussar et al., 2020). But again, these are averages across all states—variations occur by state and district. For example, graduation rates for Hispanic students ranged widely from 65% in the District of Columbia to 90% in West Virginia (U.S. Department of Education, 2019). Be aware of the graduation rates in the district where you teach and the factors that might influence those rates.

Although consistent differences still exist among groups on tests of academic abilities, most researchers agree that the reasons for these differences are mainly the legacy of discrimination, the product of cultural mismatches and language differences, or a result of growing up in poverty. Because many students from ethnic groups are also economically disadvantaged, separating the effects of these two sets of influences on school achievement is important (Milner, 2015; Shores et al., 2020). For example, one study found that learning and self-regulation skills (e.g., attentiveness, persistence, organization, learning independence) explain the literacy development of African American boys from kindergarten through fifth grade, even after taking into account the effects of the boys' SES, home environment, and problem behaviors (Matthews et al., 2010). So early development of these learning skills can help close the opportunity gap, at least for African American boys and probably for others.

Rather than focusing on achievement gaps, many educators have called for more research on the school-based assets that facilitate the growth and successes of African American and Latino students (Del Toro & Wang, 2020). Berry (2005) studied two middle-school-age African American boys who were successful in mathematics. In the lives of those students, Berry found support and high expectations from family and teachers; positive math experiences in preschool and elementary school; connections to church and athletic extracurricular activities; and positive identities as math students. One final theme characterized the successful African American boys: Their families had prepared them to understand and deal with a legacy of inequality in schools, our next topic.

The Legacy of Racial Inequality

When we considered explanations for why students with low SES have trouble in school, we mentioned the limited educational opportunities and low expectations/biases of teachers and fellow students. This also has been the experience of many students from ethnic and racial minority groups. For example, in some areas of the South in 1924, Black students attended their own, separate schools for only 6 months out of the year because they were expected to work in the fields the other 6 months. White students attended school a full 9 months. The highest grade available for the Black students was eighth grade (Raudenbush, 2009).

A minister in Topeka, Kansas, was upset about how far his young daughter had to travel just to get to her elementary school. Despite the fact that Linda Brown was accustomed to playing in her neighborhood with White, Black, and Native American children, the closest elementary school, just four blocks from her home, would not admit her because she was Black. Instead, Linda had to traverse a rail yard, cross a busy road, and then wait for a bus to take her across town to the school that served Black students. She recalled her misery on one bitter cold winter day that made her tears turn to ice. Linda wondered why she couldn't just attend the school closer to home (Genzlinger, 2018). Her parents' answer to this question, with the help of other concerned families, was to file a suit challenging the school policy. You know the outcome of the 1954 *Brown* v. *the Board of Education of Topeka* ruling: "Separate but equal" schools for Black children were declared inherently unequal.

PUT YOURSELF IN THEIR PLACE Legal segregation came to an end in 1954. Take a moment to imagine that you were living back then and that the child described in this section was your own. What would you do?

Almost 70 years later, pages of research have mostly shown that legally mandated integration is not a quick solution to the detrimental effects of centuries of racial inequality. White students left desegregated schools and neighborhoods as the number of students of color increased, leaving many urban schools today more segregated than they were before the Supreme Court ordered desegregation measures such as busing (Orfield et al., 2016). Schools in Los Angeles, Miami, Baltimore, Chicago, Dallas, Memphis, Houston, and Detroit have fewer than 11% White, non-Hispanic students. In fact, two-thirds of the schools that African American and Latino students attend are quite segregated, with high concentrations of students living in poverty, which means that racial segregation is often aligned with economic segregation (Ladson Billings, 2004; Mickelson et al., 2013; Shores et al., 2020). In school districts where Latino children make up at least 10% of student enrollment, Latino students are experiencing more segregation over time and are less likely to interact with White peers (Fuller et al., 2019).

Parent and journalist Nikole Hannah-Jones (2016) described the tension she and her husband experienced when deciding whether to allow their daughter to attend a racially segregated, low-income public school in New York City. "Hadn't we worked hard . . . precisely so that she would not have to go to the types of schools that trapped so many Black children?" This is the question many families face (see Hannah-Jones, 2015 episode on *This American Life*). Research suggests that the demographic composition of schools does indeed affect long-term psychological and academic outcomes (Graham, 2018). For example, economist Rucker Johnson (2019) found that Black adults who attended more racially desegregated schools as children lived longer, were more likely to attend college and live in racially integrated neighborhoods, and were less likely to be poor, to suffer from chronic health problems, and to go to jail than were those adults who had attended racially segregated schools. Similar research has shown that Asian American adolescents who have more cross-race friendships report better psychological well-being, particularly in contexts where anti-Asian prejudice was most prevalent (Liu et al., 2020).

But even in "integrated" schools, too often students from historically disadvantaged ethnic or racial minority groups are resegregated in low-ability tracks due to teachers' lower expectations about them (Kogachi & Graham, 2020; Tenenbaum & Ruck, 2007; Tyson, 2013).

Simply putting people in the same building does not mean that they will come to respect each other, become friends, or even experience the same quality of education (Johnson, 2019; Ladson Billings, 2004; Mickelson et al., 2013). For more information on how to understand and reduce ethnic and racial disparities in education, look at the report by the American Psychological Association's Presidential Task Force on Educational Disparities (2012). One critical step in reducing disparities in educational outcomes is to acknowledge the roles that racism and discrimination play in education.

RACISM AND DISCRIMINATION. Racial prejudice (racism) is pervasive in the United States. Although racism is not confined to one racial group, anti-Black racism has remained in the spotlight because of the killings of unarmed Black people such as Breonna Taylor and George Floyd, which sparked nationwide protests for racial justice in 2020. Even so, White and Black Americans differ in their beliefs about whether the United States should take further action to protect civil rights. More than 10,000 American adults were asked in September 2020 whether the country has done enough when it comes to giving Black people rights equal to those of White people. The perceptions were starkly different by race: 42% of White people responded that the country's response has "been about right," whereas only 5% of Black respondents chose this response (Horowitz et al., 2020b). More than 86% of Black respondents said the country had "not gone far enough."

Connect and Extend to PRAXIS II®

Racial Bias (IV, B4)

Describe the possible effects of racial discrimination and bias on minority students. What can teachers and schools do to address the lingering effects of this discrimination?

Subtle, below-the-surface racism remains. Even though it may be outside conscious awareness, it can lead to discriminatory behavior. Researchers have demonstrated this in numerous ways. For example, in response to police killings of unarmed Black men, researchers created a video game that showed a series of White or Black men holding either a gun or a non-weapon such as a flashlight or wallet. Participants in the research were told to "shoot" whenever the person in the video game held a weapon. Race was not mentioned. Nevertheless, participants shot armed targets more quickly and more frequently when those targets were Black and more quickly and more frequently decided not to shoot unarmed targets when they were White (Greenwald et al., 2003). When the participants in another study were actual police officers, they were more likely to mistakenly shoot unarmed Black suspects compared with unarmed White suspects (Plant & Peruche, 2005).

You might think that police officers and teachers are quite different. Think again. Researchers have used similar techniques to show that teachers are more likely to expect less of students from ethnic minority groups than they expect from students from ethnic majority groups. They are also more likely to disproportionately refer students from historically disadvantaged groups—and particularly Black students—for special education or disciplinary interventions (Morris & Perry, 2016; van den Bergh et al., 2010). In fact, teachers hold similarly pro-White, anti-Black biases in roughly the same proportion as members of the general public (Starck et al., 2020), and these biases have been shown to exacerbate achievement differences between their Black and White students (Chin et al., 2020). In a profession that prides itself on educating all learners equally, how and why does this happen?

People tend to over-rely on rigid, possibly biased categories when they are under stress or have limited resources (Baumeister & Bargh, 2014). Teachers know these conditions well! Teachers, like police officers and all humans, can distort information to make it fit their schema better, especially if their stereotypes include prejudiced beliefs about a group. We notice information that confirms or agrees with our stereotypes—our schema—and miss or dismiss information that does not fit (Kahneman, 2011). This can lead to actions that discriminate against others who are members of social groups whom we have categorized less favorably.

Although prejudice and discrimination come from many places—peers, media, social encounters outside of school—evidence suggests that perceiving discrimination from a teacher might be the most damaging for educational outcomes (Benner & Graham, 2013). Even if teachers are unaware of their prejudices, those very prejudices can affect the expectations teachers hold for their students and how they interpret students' behaviors (Brown, 2017). For example, researchers at Yale asked teachers to watch videos featuring racially diverse preschool children. Some teachers were primed to expect the students to show "challenging behaviors," whereas others were not. Teachers primed to look for misbehavior gazed longer at Black children—especially Black boys—than at White children, suggesting a

form of implicit bias. Both Black and White teachers showed similar patterns (Gilliam et al., 2016). This type of unconscious bias could be partly responsible for the disproportionate number of suspensions of Black students relative to their White peers (U.S. Department of Education, 2016). Another study found that non-Black high school teachers held lower expectations of Black students (particularly of boys) than did Black teachers (Gershenson et al., 2016). Implicit biases can have serious effects (even if unintentional) on students' educational attainment.

Clearly, many learners face prejudice and discrimination in subtle or blatant ways every day. Black and Hispanic students begin to lose out in science and math as early as elementary school. They are chosen less often for gifted classes and acceleration or for enrichment programs. They are more likely to be tracked into "basic skills" classes (Tyson, 2013). As they progress through middle school, high school, and college, their paths take them further and further out of the pipeline that produces our scientists. If they do persist and become scientists or engineers, they, along with women, will still be paid less than White employees for the same work (National Science Foundation, 2019; Shen, 2016). Hispanics, African Americans, and Native Americans make up about 35% of the U.S. population, but in 2019, about 8% of the doctorates awarded went to Hispanic students, 7% to African Americans, and fewer than 1% to Native Americans. In contrast, 38% of the doctorates were awarded to nonresidents of the United States (National Science Foundation, 2020).

The families of racial and ethnic minority students often have to be vigilant about discrimination to protect their children from its adverse psychological, social, and academic consequences. Some evidence has shown that children who have been socialized to understand racism and discrimination are better equipped to handle them when they arise (Park et al., 2018; Yip et al., 2019).

Module 5 Summary

Ethnicity and Race in Teaching and Learning (pp. 56–64)

Distinguish between ethnicity and race. Ethnicity (culturally transmitted behavior) and race (a socially constructed categorization based on physical traits) are significant categories people use to describe themselves and others. Ethnic or racial minority groups (either numerically or historically marginalized) are rapidly increasing in population.

How can differences in the ethnicity of teachers and students affect school performance? Conflicts can arise from differences between teachers and students in culture-based beliefs, values, and expectations. Cultural conflicts are usually about below-the-surface differences because when subtle cultural differences meet, misunderstandings are common. Students in some cultures learn attitudes and behaviors that are more consistent with school expectations. Differences in cognitive and academic abilities among ethnic groups are largely the legacy of racial segregation and continuing prejudice and discrimination.

MODULE 6 Gender Identify and Sexual Orientation

Learning Objective 2.4 Describe the development of gender, gender identity, and sexual orientation, and discuss their roles in teaching and learning.

Gender and Sexual Orientation in Teaching and Learning

In this section we examine the development of gender identity and sexual orientation. We particularly focus on how people develop, how they are socialized, and the role of teachers in providing an equitable education for all students, regardless of their particular identities.

Sex and Gender

The word *gender* usually refers to traits and behaviors that a particular culture judges to be appropriate for boys and girls, men and women. In contrast, *sex* typically refers to biological differences assigned at birth. As with other cultural labels, the terms used in this area can be complex and controversial (Hyde et al., 2019). An individual's identity in terms of gender and sex is multifaceted. In this section, we examine the role of three important facets: gender identity, gender roles, and sexual orientation (Ruble et al., 2006). **Gender identity** is an individual's self-identification as a gendered person. Although gender identity has historically been described in binary terms (i.e., male or female), it is better conceptualized along a continuum. This more inclusive view recognizes that physiologically and psychologically, gender is more like a mosaic than an either/or categorization (Hyde et al., 2019). It is therefore no surprise that many forms of gender expression exist. **Gender roles** are those behaviors and characteristics that the culture stereotypically associates with a binary (male/female) view of gender. **Sexual orientation** is also a multidimensional construct that can refer to people's sexual identity, sexual attraction, and/or sexual behavior (APA, 2015; Wolff et al., 2017). Relations among these three elements are complex. For example, a young woman might identify herself as female (gender identity) but behave in ways that are not consistent with the stereotypical female gender role (play football or wrestle) and might be attracted to both men and women (e.g., bisexual). Let's look at some of these facets in further detail.

Gender identity
The sense of self along the female-to-male continuum or as neither female nor male (i.e., nonbinary).

Gender roles
The behaviors and characteristics that the culture stereotypically associates with being a man or a woman.

Sexual orientation
A multidimensional construct that refers to people's sexual identity, sexual attraction, and/or sexual behavior.

Gender Identity

Gender identity refers to one's individual sense of being a woman, a man, both, or neither (Brown & Stone, 2016). Erikson and many other earlier psychologists thought that identifying one's gender is straightforward; one simply realizes that they are a man or a woman and acts accordingly. But today, we know that an individual's gender identity might be different from the sex assigned at birth. The term *cisgender* (pronounced "sis-gender") is used to describe an individual whose gender identity matches the biological sex that they were assigned at birth. *Transgender* individuals often report feeling trapped in the wrong body: They experience themselves as female, whereas their biological sex is male, or vice versa (Lhamon & Gupta, 2016; Ruble et al., 2006). In a poignant self-disclosure, one of my undergraduate students recently told our class that they spent their childhood knowing that they were really a boy, not the girl they were raised as. The student described having the distinct feeling that "my insides don't match my outsides." Others might simply behave in *gender-expansive, gender nonconforming*, or *gender atypical* ways (Diamond, 2020). A young boy might surround himself with girls, play with dolls, and dress as girls do. He might identify with most girls more than he identifies with most boys and might therefore resist a binary gender label.

Some children's gender identity is formed early and remains relatively permanent. However, gender identity formation might take longer for others. Students who express themselves in gender-atypical ways might be vulnerable to stigma, discrimination, or low self-beliefs. For example, researchers in Holland asked seventh-grade students how gender typical they felt. Students who reported higher gender atypicality felt less confident in their academic capabilities than did gender-typical students (Vantieghem et al., 2014). Teachers can play an important role in supporting students during their process of gender identity formation (Fabes et al., 2019; Leaper & Brown, 2018). Three major ways that they can do this is by addressing harassment and bullying, making school spaces more gender inclusive (avoiding segregation by gender), and dealing respectfully with students' records, names, pronouns, and privacy (see *Beyond the Binary: Discussing Transgender and Gender Non-Conforming Identity in K–12 Schools*, ADL, 2019).

Gender Roles

Gender roles are expectations about how people should behave in gender-conforming ways—in other words, in ways consistent with what is considered masculine or feminine. Gender roles vary by culture, time, and place. What was expected of women in the United States in the 1700s definitely has changed even though women generally still are the primary caregivers and are in charge of the home.

When and how do children develop their understandings of masculine and feminine gender roles? As early as age 2, children are aware of gender differences. They know whether they are girls or boys and that Mommy is a girl and Daddy is a boy. By age 3 or so, many begin to believe that their sex cannot be changed. Biology plays a part in gender-role development: Very early, hormones affect activity level and aggression, with boys tending to prefer active, rough, noisy play. Play styles lead young children to prefer same-sex play partners with similar styles, so by age 4, children spend three times as much play time with same-sex playmates as with opposite-sex playmates; by age 6, the ratio is 11 to 1 (Halim et al., 2013; Hines, 2004). Biology is not the whole story, however. The fact that boys tend to play with boys and girls tend to play with girls might lead to a gender-segregation cycle by which binary gender-role norms are defined and reinforced (Martin et al., 2014).

Boys and girls might be treated differently, too. Researchers have found that boys are given more freedom to roam the neighborhood and are allowed to attempt potentially dangerous activities earlier, such as crossing the street alone. Thus, independence and initiative seem to be encouraged more in boys than in girls. In fact, parents, peers, and teachers might reward behaviors that seem gender appropriate—gentle kindness in girls and strong assertiveness in boys (Brannon, 2002; Brown, 2014).

Then there are the toys! Walk through most stores' toy sections or order a child's fast food meal and see what is offered for girls and boys. Dolls and kitchen sets for girls and toy weapons for boys have been with us for decades. Then came aisles of princess paraphernalia for girls and battle video games for boys. Are consumers partly to blame? Adults often select gender-typed gifts for children, and some fathers discourage their young sons from playing with "girl" toys (Brannon, 2002; Brown, 2014). When a large retailer announced recently that it would no longer segregate toys by gender, many parents were outraged. And let's face it, gender socialization does not stop in childhood. I was recently helping a first-year student move into his co-ed dormitory on campus. His door was decorated with a hot-rod car with his name on it; his female dorm-mates had princess tiara name cards on their doors. What are the consequences of such environmental messages about gender?

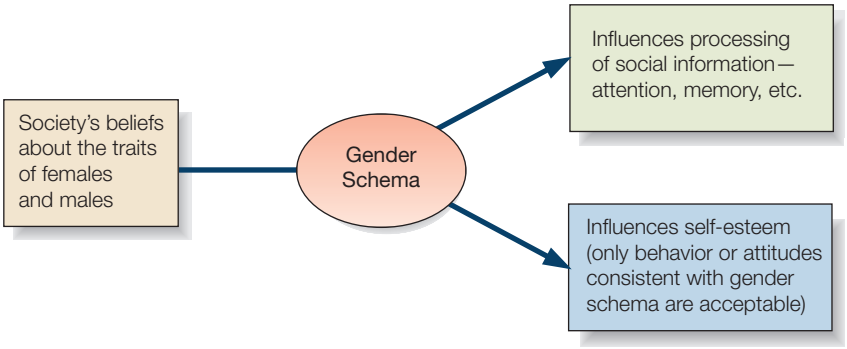
Gender schemas
Organized cognitive structures that include gender-related information that influences how children think and behave.

Through their interactions with family, peers, teachers, toys, media, and the broader social environment, children begin to form **gender schemas**, or organized networks of knowledge about what it means to be a man or a woman (Ward & Grower, 2020). Gender schemas help children make sense of the world and guide their behavior (see Figure 2.6). So a young girl whose schema for "girls" includes "girls play with dolls and not with trucks" or "girls can't be scientists" will pay attention to, remember, and interact more with dolls than with trucks, and she might avoid science activities (Golombok et al., 2008; Leaper, 2002). Of course, these are averages, and individuals do not always fit the average. An individual girl might decide, for example, that the gender schema "trucks are for boys" doesn't matter to her. She will play with the truck if it interests her (Bigler & Liben, 2007). By age 4, children have an initial sense of gender roles, and by 5 or so, they have developed a gender schema that describes what clothes, games, toys, behaviors, and careers are "right" for boys and for girls—and these ideas can be quite rigid (Ellemers, 2018; Halim et al., 2013).

Even in this era of great progress toward equal opportunity, a preschool girl is more likely to tell you that she wants to become a nurse than to say that she wants to become an engineer. After she had given a lecture on the dangers of sex stereotyping in schools, a

Figure 2.6 Gender Schema Theory

According to gender schema theory, children and adolescents use gender as an organizing theme to classify and understand their perceptions about the world.



colleague of mine brought her young daughter to her college class. The students asked the little girl, "What do you want to be when you grow up?" The child immediately replied, "A doctor," and her professor/mother beamed with pride. Then the girl whispered to the students in the front row, "I really want to be a nurse, but my mommy won't let me." Actually, this is a common reaction of young children. Preschoolers tend to have more stereotyped notions of sex roles than do older children, and all ages seem to have more rigid and traditional ideas about male occupations than about what occupations women should pursue (Woolfolk & Perry, 2015).

Later, as children approach and enter puberty, they might become even more focused on behaving in "masculine" or "feminine" ways, as defined by their peer culture, social media, parents, or the environment. For example, in one study, children and early adolescents who were shown sexualized and nonsexualized images of girls rated the sexualized girls as more popular than the nonsexualized girls but also viewed the sexualized girls as not as athletic, smart, or nice (Stone et al., 2015). The sexualized gender stereotype was more strongly endorsed by girls and by older students, suggesting that exposure to sexualized images in the media increases as children get older and might be especially important to girls as they form their schemas about gender.

Other research has shown that when parents (particularly mothers) see the usefulness and value of science, technology, engineering, and mathematics (STEM) fields, their children enroll in more STEM courses throughout high school (Rozek et al., 2015). Even small changes in the learning environment (e.g., when a computer science classroom contains stereotypical objects such as science fiction books versus plants) can invoke gender stereotypes that disadvantage some students. One study showed that just reading about a stereotypical computer science classroom caused adolescent girls to feel less like taking the class for fear they would not belong (Master et al., 2016). The bottom line is that so many factors, from biology to cultural norms, play roles in gender-role development. Beware of either/or explanations!

Gender Bias and Sexism in Curriculum and Media

While I (Anita here) was reviewing this very page for a previous edition, riding cross-country on a train, the conductor stopped beside my seat. He said, "I'm sorry, dear, for interrupting your *homework*, but do you have a ticket?" I had to smile at his (I'm sure unintended) sexism. I doubt that he had asked the same question of the man across the aisle who was writing on his legal pad. Like racial discrimination, messages of sexism and **gender biases** can be subtle, and they can and do appear in classrooms (see Brown & Stone, 2016; Leaper & Brown, 2014).

Gender biases
Different views of men, women, or gender-nonconforming people often favoring one group over the other.

Connect and Extend to PRAXIS II®

Gender Bias (IV, B4)

There has been much debate in the news media over possible gender bias in schools. What can you as a teacher do to reduce or eliminate gender bias and its effects?

Unfortunately, schools often foster sexism in several ways. Publishers have established guidelines to prevent gender bias in educational materials, but it still makes sense to check those materials for stereotypes, particularly given the slow turnover of books that populate school library shelves. For example, even though children's books now have equal numbers of men and women as central characters, there still are more men in the titles and the illustrations, and the characters (especially the boys) continue to behave in stereotypical ways. Boys are aggressive and argumentative, and girls are expressive and affectionate. Girl characters sometimes cross gender roles to be more active, but boy characters seldom show "feminine," expressive traits (Brannon, 2002; Brown, 2014). Also, virtual learning sites, social media sites, and online sources such as YouTube have not been carefully screened for gender, racial, ethnic, economic, religious, or age stereotypes and biases, and they can be sources of stereotyped messages (Henry, 2011; Ward & Grower, 2020). Digital games and even school materials often feature hypermasculine or hyperfeminine characters. One look at the body features of men and women in video combat games shows what unreal and unhealthy body images they promote.

Another "text" that students read long before they arrive in your classroom is televised and online media. A content analysis of television commercials found that White male characters are more prominent than any other group. Even when only the actor's voice can be heard, men are 10 times more likely to narrate commercials. And the same pattern of men as the "voice of authority" on television occurs in the United Kingdom, Europe, Australia, and Asia. Women are more likely to be depicted as dependent on men and often are shown at home (Brannon, 2002). The #MeToo movement has brought greater awareness to pervasive sexism in televised media and advertising. The documentary film *Miss Representation* (Newsom, 2011) offers numerous compelling (and rather shocking) examples of how mainstream media and culture depict girls and women in hypersexualized and underpowered positions. Similarly, the film *The Mask You Live In* explores how boys are often subjected to narrow definitions of masculinity that cause stress and dissonance (see http://therepresentationproject.org for more information, including an educator toolkit). *Disclosure*, a 2020 Netflix documentary, shows how unfavorably transgender individuals have been depicted in films and on television. How might these messages affect how people think about themselves and others?

Gender Bias in Teaching

Quite a bit of research has examined teachers' gendered treatment of students. You should know, however, that most of these studies have focused on White students. Emerging research points to the ways in which intersectionality provides a useful lens for understanding teachers' different interactions with students of various gender and race groups. The *Guidelines: Avoiding Gender Bias in Teaching* on the following page provide ideas for teaching all your students effectively and empathetically. Let's look at some related research findings.

Many studies describe what seem like biases favoring boys. One of the best-documented findings of the past 30 years is that teachers have more overall interactions with boys than with girls; however, this includes more negative interactions with boys but not more positive interactions (Jones & Dindia, 2004). This is true from preschool to college. Teachers ask more questions of male students, give them more feedback (praise, criticism, and correction), and offer them more specific and valuable comments. Of course, these differences are not evenly distributed. Some boys, generally high-achieving White students, receive more than their share, whereas high-achieving White girls receive the least teacher attention. On average, teachers rate boys as more competent in mathematics than girls, unless girls are perceived as working harder, behaving better, and being more eager to learn than boys. Only then do teachers rate girls' math competence similarly to that of boys (Robinson-Cimpian et al., 2014).

Recent efforts have also examined how teachers' implicit beliefs and attitudes might differentially affect girls and boys. For instance, some evidence has shown that girls pick up on the attitudes of their teachers. In one study, girls whose *teachers* had higher math anxiety scored lower on end-of-year math tests and were more likely to endorse the view that boys are better than girls in math (Beilock et al., 2010). Another study showed that middle school girls who perceived that their math teachers treated them differently because of their gender performed

GUIDELINES

Avoiding Gender Bias in Teaching

Check to see whether textbooks and other media you are using present an honest view of the options open to men, women, and gender-nonconforming individuals.

Examples

1. Identify whether men, women, and gender-nonbinary people are portrayed in traditional or nontraditional roles at work, at leisure, and at home.
2. Discuss your analyses with students, and ask them to help you find gender-role biases in other materials—magazine advertising, TV programs, and news reporting, for example.

Watch for any unintended biases in your own classroom practices.

Examples

1. Monitor whether you group students by gender for certain activities. Consider how being in gendered groups might feel to students who do not identify as boys or girls. Is the grouping appropriate?
2. Monitor whether you call on one gender group more frequently for certain answers—boys for math and girls for poetry, for example. Consider the quality of your feedback to students.
3. Monitor your metaphors. Don't ask students to "tackle the problem."

Look for ways in which your school might be limiting the options open to students with different gender identities or expressions.

Examples

1. Find out what curricular or career advice guidance counselors give to students.
2. Look into whether a good sports program is accessible to all.
3. See whether girls are encouraged to take advanced courses in science and mathematics and whether boys are encouraged to take English and foreign language classes.

Use gender-free language as much as possible.

Examples

1. Make sure you use inclusive terms (e.g., speak of "law-enforcement officer" and "mail carrier" instead of "policeman" and "mailman").
2. Be sure you name a committee "head" instead of a "chairman."
3. Discuss personal pronouns with your students. Make sure you are using the pronoun they would like you to use (e.g., *her, him, they*).

Provide counter-stereotypical gender role models.

Examples

1. Assign articles written by female research scientists or mathematicians.
2. Have recent female graduates who are majoring in science, math, engineering, or other technical fields come to class to talk about college.
3. Create electronic mentoring programs for students that connect them with gender-diverse adults who are working in areas of interest to the students.

Make sure all students have a chance to do complex, technical work.

Examples

1. Experiment with collaborative groups to avoid gender-stereotypical work assignments (e.g., girls as the secretaries, boys as the scientists).
2. Rotate jobs in groups or randomly assign responsibilities.

What if you witness gender bias as a student teacher? For ideas, see https://learningforjustice.org and search for "classroom resources."

worse on subsequent math tests and reported decreased motivation for math in high school (McKellar et al., 2019). Teachers might not be aware of how their behaviors are influenced by their own attitudes, but through direct instruction, modeling, or differential interactions with boys and girls, they can have a powerful influence on both how students see themselves and how they perform (Gunderson et al., 2012).

Not all biases in school favor boys. In the past 10 years in North America, Western Europe, Australia, and some Asian countries, educators have raised questions about whether schools are serving boys well. This concern is fueled by data from many countries that seem to show underachievement in boys. In fact, the underachievement of boys in school has been called "one of the most pressing educational equality challenges of current times" (Hartley & Sutton, 2013, p. 1716). More dramatic accusations include that schools are trying to destroy "boys' culture" and force "feminine, frilly content" on boys. Boys are referred to special education services at greater rates than are girls, and these rates are even higher for boys who are members of ethnic or racial minority groups (Artiles, 2019).

One possible explanation put forth for why boys struggle in school is that the expectations of schooling do not fit the way boys learn (Gurian & Stevens, 2005), particularly African American boys (Stinson, 2006). Another suggestion is that boys sabotage their own learning by resisting school expectations and rules to "display their masculinity and get respect" (Kleinfeld, 2005, p. B6). Some have suggested that boys need smaller classes, more discussions, better discipline, mentoring programs, and more men in their schools—90% of elementary teachers are women. One suggestion for making schools more effective for both boys and girls is single-sex classrooms. In 2008, *The New York Times Magazine* had a cover story about that topic (Weil, 2008), and in 2015 and 2016, *The Atlantic* reported on its "resurgence" (Anderson, 2015; Yap, 2016). During the past decade, many school districts across the United States have experimented with single-sex classrooms in core subjects such as English, science, and mathematics (Herron, 2013). Do gender-segregated approaches work? Read the *Point/Counterpoint* for the arguments.

POINT/COUNTERPOINT: Should Girls and Boys Be Taught Differently?

Point

Proponents say that students are better off learning some things with their same-gender counterparts. Critics say that gender-segregated classrooms change little for learners and reinforce problematic stereotypes that could lead to greater gender disparities.

Boys and girls have unique strengths and challenges and should be taught in different ways. Many educators paid attention when, in 2001, the No Child Left Behind (NCLB) Act began to allow public schools to offer same-sex classes, which led to the 2006 amendment to the Title XI regulation that removed the ban on single-sex public education. In the spirit of innovation, many schools took up the call and began catering instruction to the unique needs of boys and girls. After all, findings from the 2012 PISA test revealed that among 15-year-olds worldwide, boys were disproportionately overrepresented at the lowest and highest ends of achievement in math and reading, and girls generally reported lower self-confidence and higher anxiety in math than boys (OECD, 2015). It seemed logical to examine whether all students would benefit from gender-specific instruction (Bigler et al., 2014).

Since then, thousands of school districts across the United States have implemented some degree of single-sex education (Klein et al., 2014). Some organizations, such as the Gurian Institute (http://www.gurianinstitute.com), have offered books and professional development workshops for schools focused on how best to educate each gender based on the core assumption that boys and girls have different learning "styles" (Gurian & Stevens, 2005). A staunch proponent of single-sex classrooms, Leonard Sax (2005) has suggested that these styles are rooted in fundamental biological differences between boys and girls

that require different instructional approaches. Single-sex classrooms can help girls develop their own strengths and boost their self-confidence, interests, and achievements, particularly in STEM disciplines. Boys, on the other hand, can focus on strengthening their literacy skills and cooperativeness. Anecdotal findings reported by Gurian and others, primarily in popular media, have shown gains for both genders (e.g., Gurian et al., 2009). Students and their families might have some choice in whether students attend a single-sex or a mixed-sex school, which could mean that such students are predisposed to respond well to the single-sex learning environment.

Counterpoint

Girls and boys are more similar than different and should be taught together. Researchers who have looked critically at data used to support gender-segregated educational approaches have argued that these approaches come up short in fulfilling their promise of promoting gender equity in learning and psychological well-being. In their 2011 article, "The Pseudoscience of Single-Sex Schooling," Diane Halpern and her colleagues noted that research studies on same-sex education have been "deeply misguided, and often justified by weak, cherry-picked, or misconstrued scientific claims rather than by valid scientific evidence" (p. 1706). For example, when researchers take into account students' initial performance levels, many students' achievement gains in single-sex classrooms disappear. These scholars argue that studies of single-sex schooling have lacked the statistical rigor of randomized assignment, and therefore findings could be due to sampling or researcher bias. In fact, Halpern and colleagues claim that separating boys and girls actually *worsens* outcomes by making gender differences (and, therefore, stereotypes) more noticeable. They point to research showing that when any group of humans is set apart from another (based on gender, eye color, or even T-shirt color), people develop intergroup biases. Single-sex education, they argue, minimizes the very opportunities needed for gender equity—namely, teaching boys and girls to work alongside each other. "Positive and cooperative interaction with members of other groups is an effective method for improving intergroup relationships" (p. 1707).

But what about the evidence of biological differences between men and women? Are men really from Mars and women from Venus? Hyde (2005) conducted a *meta* meta-analysis (i.e., a review of 46 meta-analyses) summarizing hundreds of studies on sex differences in a range of human behaviors. Her findings provided evidence for what she called the "gender similarities hypothesis." With some important exceptions, men and women are highly similar on numerous psychological and performance metrics. The magnitude of these differences fluctuates across the life span and in different contexts, which can lead researchers to overestimate the size and stability of sex differences and ignore the fact that gender is better treated as a continuum (Hyde et al., 2019). For example, much of the evidence on sex differences has come from studies with adults who have had years of socialization; these sex differences are not necessarily present in children. Maybe boys and girls are from the same planet after all . . . and should therefore be educated in similar ways.

Beware of Either/Or

So, do single-sex schools or classrooms improve learning? The answer is "It depends." One meta-analysis offers the most comprehensive answer to date, addressing some of the methodological problems identified by Halpern and her colleagues. Pahlke et al. (2014) examined results from 184 studies involving 1.6 million students in grades K–12 from 21 countries. They looked at whether students learning in single-sex schools versus those learning in co-educational schools displayed different performances and attitudes. To account for variable quality in research designs, the researchers ran separate analyses for studies that used random assignment and those that did not. Among studies that randomly assigned students to single-sex classrooms, only trivial differences emerged between students in the two settings. Both girls and boys performed marginally better in single-sex schools, but girls attending co-educational schools had higher educational aspirations than did girls attending same-sex schools. Furthermore, gender-nonbinary and gender-nonconforming students have been overlooked in studies that consider gender as a binary variable.

Both proponents and critics of single-sex schools generally agree that good education is never one-size-fits-all. Teachers must realize that there are no boy- or girl-specific teaching strategies—good teaching is good teaching, and inclusive approaches serve all students. Regrouping students by sex does not make teaching easier; in fact, it can make class management more difficult and can reinforce rigid gender stereotypes that are harmful (Fabes et al., 2019). The *Guidelines: Avoiding Gender Bias in Teaching* provide additional ideas about ways to prevent gender bias for all students in your classes. Giving careful attention to each student's motivation and achievement might mean that different approaches are called for at different times. As William James (1899/2001) long ago reminded teachers: "One can draw no specific rules for all this. It depends on close observation in the particular case" (p. 55).

Sexual Orientation

Researchers have often defined sexual orientation in terms of sexual attraction—"an internal mechanism that directs a person's sexuality to females, males, or both, perhaps to varying degrees" (Savin-Williams & Vrangalova, 2013, p. 59). However, some people identify as asexual and may not experience sexual attraction to others (see The Asexual Visibility & Education Network, n.d.). Sexual orientation can also be defined in terms of how a person identifies or behaves (Wolff et al., 2017). Sexual orientation and gender identity are separate and distinct aspects of human development (Orr et al., 2015). For example, a person who identifies as a woman might be attracted to both men and women (i.e., a bisexual orientation). Some labels for sexual orientation include *gay, lesbian, bisexual, asexual*, and *pansexual*. Another frequently used category is "questioning," which refers to being unsure of one's sexual orientation, or "queer," which some people use to define their more fluid sexual or gender identity (Robinson & Espelage, 2012). But sexual orientation labels, like identity labels, can be incomplete representations of how individuals refer to themselves, and some view sexual orientation on a continuum or prefer no label at all (Savin-Williams, 2016). This makes it somewhat difficult to assess the precise number of individuals of different sexual orientations within a population (Bailey et al., 2016). However, the Division of Adolescent and School Health at the Centers for Disease Control and Prevention estimates that among U.S. adolescents, 84.4% identify as heterosexual, 2.5% as gay or lesbian, 8.7% as bisexual, and 4.5% as not sure (CDC, 2020).

Quite a few identity-development models have included a description of how individuals come to understand their sexual orientation if they are not heterosexual. Generally, the models include the following or similar stages (Savin-Williams & Cohen, 2015).

- *Feeling different*—Beginning around age 6, the child might be less interested in the activities of other children who are the same sex. Some children might find this difference troubling and fear being "found out." Others do not experience these anxieties.
- *Feeling uncertain*—In adolescence, as they feel attractions for peers of the same sex, students might be confused, upset, lonely, and unsure of what to do. They might lack role models and might try to change themselves by becoming involved in activities and dating patterns that fit heterosexual stereotypes.
- *Acceptance*—As adolescents or young adults, many individuals develop a sexual orientation and identify themselves as gay, lesbian, or bisexual. They may or may not make their sexual orientation public but might share the information with a few friends.

One problem with phase models of identity development is that the identity achieved is assumed to be final. Actually, newer models emphasize that sexual orientation can be flexible, complex, and multifaceted: It can change over a person's lifetime (Diamond, 2020). For example, people may have dated or married opposite-sex partners at one point in their lives but have same-sex attractions or partners later in their lives, or vice versa (Garnets, 2002).

Discrimination Based on Gender Identity and Sexual Orientation

Children and adolescents who express their gender or sexual orientation in nonconforming ways (that is, whose expressions are not typical of others their age) are more likely than their classmates to face discrimination by peers and adults (Brown, 2017; Brown & Stone, 2016; Horn, 2019). For example, a boy whose preferences or behaviors differ from the norms of masculinity is often teased, subjected to homophobic slurs, stigmatized as being too feminine, or—worse—physically assaulted. This is an affront to all gender groups. Youth who identify as lesbian, gay, transgender, or bisexual (often referred to under the more inclusive term *sexual minority youth*) are more likely to be victims of aggression at school, according to a meta-analysis (Toomey & Russell, 2016). National survey data have shown this, too.

The 2019 National School Climate Survey asked more than 16,000 adolescents to report their experiences in the past year. Among sexual minority youth who took the survey, almost all (98.8%) had heard the word "gay" being used in a derogatory manner, 69% had been victims of verbal harassment or threats, and 26% were physically harassed or assaulted in the past year (Kosciw et al., 2020). Almost all reported feeling distressed over these incidents, and many said they did not feel safe at school because of their sexual orientation (59%) or gender expression (43%). Furthermore, two-thirds of students said that they had heard teachers or other school staff make negative remarks about gender expression, and more than half had heard teachers make homophobic remarks. These stressors can lead to academic disengagement and lower academic performance among gender-minority and sexual-minority youth (Poteat et al., 2014).

The stress associated with such victimization is one reason sexual minority students are at greater risk than their heterosexual peers of missing school and attempting suicide (Robinson & Espelage, 2012). Transgender students are particularly susceptible to increased stress and suicide (dickey & Budge, 2020). Fortunately, educational programs and activities that are run by schools receiving U.S. federal assistance must abide by Title IX of the Education Amendments of 1972. Title IX was designed to protect the educational rights of all students and ensures them a safe and nondiscriminatory environment, regardless of their gender identity (Lhamon & Gupta, 2016). However, the Trump administration rolled back some of the protections for transgender and gender-nonbinary students. An executive order signed by the Biden administration has signaled that protections will once again be put into place under Title IX (Gupta et al., 2021). These shifts indicate that the struggle for equal rights continues for gender and sexual minority individuals.

How can teachers create a safe learning environment for all students, regardless of their gender identity or sexual orientation? A teacher's ultimate goal, as one superintendent observed, should be to determine what a child needs "to feel safe, included, and supported" (Orr et al., 2015, p. ii). We talk about bullying and teachers' roles in handling all types of bullying in Cluster 13. For now, let's consider what you can do if students come to you with concerns about their gender identity or sexual orientation. Even though parents and teachers are seldom the first people to hear about an adolescent's identity concerns, you can be prepared. If a student does seek your counsel, Table 2.4 on the next page provides some ideas for reaching out and creating a safe environment for gender and sexual minority youth. See more ideas from the *2019 Safe Space Kit: A Guide to Supporting Lesbian, Gay, Bisexual, Transgender and Queer Students in Your School*, published by GLSEN. In addition, you might find it helpful to consult *Schools in Transition: A Guide for Supporting Transgender Students in K–12 Schools* (Orr et al., 2015). Both resources are readily available online. By simply offering a nonjudgmental presence, teachers can help gender and sexual minority youth to develop a more positive and healthy identity (Riggle & Rostosky, 2012). They can also be advocates for school policies and protections that make school a safe place for all students (see Collins & Ehrenhalt, 2018, *Best Practice for Serving LGBTQ Students*, from https://www.learningforjustice.org).

We have dealt with a wide range of cultural differences in this cluster. How can teachers provide an appropriate education for all of their students? We turn now to this question.

Table 2.4 Reaching Out to Help Students of Diverse Sexual Orientations

The GLSEN Safe Space Kit provides tips for youth-service providers in schools for creating a safe and supportive learning environment for LGBTQ youth.

TIPS FOR CREATING A SAFE ENVIRONMENT FOR LGBTQ STUDENTS
It is important to create and maintain an environment in which lesbian, gay, bisexual, transgender, queer-identifying youth and youth questioning their own sexual orientation feel welcome and safe. Here are several steps you can take:
MAKE YOUR SUPPORT VISIBLE Safe Space stickers, posters, or other LGBTQ-affirming materials in your classroom can signal to students that you are an ally. Also consider letting staff in your school know that you support LGBTQ individuals.
LISTEN One of the best things that you can do is to invite students to express what is going on in their lives and to listen without judgment.
AFFIRM Use stories, curricula, and words to convey to students that they are not alone. Some LGBTQ youth feel isolated and lack a supportive social network with whom they can discuss their sexual orientation. Allow students to self-identify and use terms that affirm their identity.
CONNECT STUDENTS TO RESOURCES You do not have to be the expert. Refer distressed students to someone who is trained to deal with sexual identity development. This is a demonstration of care, not a dismissal of responsibility. You can also help interested students find LGBTQ-affirming organizations and clubs.
INTERVENE If you see or hear about a student being verbally or physically harassed, take action immediately. It is important that targeted students know that you will intervene and that perpetrators know that any form of harassment is unacceptable.
RESPECT CONFIDENTIALITY Be sure to let students who confide in you know that you won't share their information unless they ask for your help.
FOLLOW UP If a student confides in you, check in with them with acceptance and understanding and to see if there is anything further you may be able to do.
Additional steps you can take: • Work on your own sense of comfort around issues of sexual orientation and gender identity. • Dispel myths around sexual orientation by knowing facts and sharing that information. • Work on setting aside your own personal biases to better serve students dealing with issues around sexual orientation and gender identity.

Source: Adapted from GLSEN. (2019). *Safe Space kit: A guide to supporting lesbian, gay, bisexual, transgender and queer students in your school.*

Module 6 Summary

Gender and Sexual Orientation in Teaching and Learning (pp. 64–74)

What are gender identity and gender roles, and how do they develop? Gender identity is a personal view of oneself along the female-to-male continuum or in a nonbinary way. Gender roles refer to a set of stereotypically masculine or feminine characteristics and behaviors. The differential behavior of parents and teachers toward male and female children and the larger social environment influence children's understandings of their gender roles. Through their interactions with family, peers, teachers, and the environment in general, children begin to form gender schemas, or organized networks of knowledge about what it means to belong to a particular gender group.

How are gender biases communicated? In children's books, there are more males in the titles and the illustrations, and the characters (especially the boys) continue to behave in stereotypical ways. Girl characters sometimes cross gender roles to be more active, but boy characters seldom show "feminine," expressive traits. Some overrepresentation of gender exists in television commercials and online media, too. Teachers interact more with boys in both positive and negative ways. Lately some educators have claimed that schools are not supportive of boys, and single-gender classrooms have been suggested as an answer. The research findings on the value of these classrooms are mixed.

What are the stages of developing one's sexual orientation? Stages of developing a sexual orientation can follow a pattern from discomfort to confusion to acceptance, particularly for sexual minority (e.g., gay, lesbian, bisexual, and transgender) students. Some researchers contend that one's sexual orientation is not always permanent and can change over the years.

MODULE 7 Diversity and Teaching

Learning Objective 2.5 Define multicultural education and apply research on diversity to the creation of culturally relevant classrooms.

Creating Culturally Welcoming Classrooms

Picture a tenth-grade class in urban Philadelphia, a first-grade class in rural Kentucky, and an eighth-grade class in El Paso. Now picture the classrooms where you were educated (those that you thought about at the beginning of the cluster) and those you see on television. Classrooms are the daily gathering places for a unique blend of individuals who are poor and rich and everything in between, who hail from widely varying cultural heritages, who express their gender and sexual orientation in stereotypical and nonstereotypical ways, and who display a rich tapestry of differences in other important aspects of life, such as religion, family composition, political affiliation, and (dis)ability. How can teachers, who begin their work from their own unique cultural locations, create classrooms that can hold, protect, and even embrace cultural diversity?

Some educators have noted that creating culturally compatible classrooms is the foundation of providing a **multicultural education**, defined as

> A process of comprehensive school reform and basic education for all students. It challenges and rejects racism and other forms of discrimination in schools and society and accepts and affirms the pluralism (ethnic, racial, linguistic, religious, economic, and gender, among others) that students, their communities, and their teachers reflect. (Nieto & Bode, 2012, p. 42)

James Banks (2015) described five core dimensions of multicultural education. Teachers are likely to be most familiar with the *content integration* dimension, which involves using examples and content from a variety of cultures when teaching a subject. And because they believe that multicultural education is simply a change in content, some teachers assume that multicultural education is irrelevant for subjects such as science and mathematics. But multicultural education is more than a change in curriculum. To make education welcoming and inclusive for all students in all subjects, we must consider other dimensions as well. Teachers enact multicultural education by embracing *an equity pedagogy*, which means they diversify their teaching practices to meet the needs of a wide range of learners from different socioeconomic, cultural, and ethnic backgrounds. They also pay attention to the ways in which students' cultural frames affect the *knowledge construction process*.

Multicultural education also involves *prejudice reduction* efforts, which focus on teaching practices that help reduce negative attitudes and biases about different cultural groups. Finally, *an empowering school culture and social structure* are critical. The way the athletics and counseling programs are structured, the teaching method used, lessons about prejudice, perspectives on knowledge—these and many more elements contribute to a true multicultural education that empowers all people.

Banks's (2015) five-dimensional model is just one framework providing ways to create a multicultural learning environment. An examination of the alternative approaches to multicultural education is beyond the scope of an educational psychology text, but be aware that no general agreement exists about the "best" approach to use. Nevertheless, many educators have suggested that a *culturally relevant* and *culturally sustaining* pedagogical approach is beneficial in all classrooms.

Connect and Extend to PRAXIS II®

Multicultural Education (III, B)

Know the major dimensions of multicultural education. Describe how these dimensions influence each other.

Multicultural education

Education that promotes equity in the schooling of all students and challenges racism and other forms of discrimination.

Culturally Relevant Pedagogy

Many scholars have described methods for teaching in a culturally relevant and culturally sustaining way (Delpit, 1995, 2012; Emdin, 2016; hooks, 1994; Love, 2019; Milner, 2015; Siddle Walker, 2001; Stevenson, 2014). The work of Gloria Ladson Billings (1990, 1992, 1994, 1995, 2009) is a good example. For 3 years, she studied excellent teachers in a California school district that served an African American community. To select the teachers, she asked parents and principals for nominations. Parents nominated teachers who respected them, created enthusiasm for learning in their children, and understood their children's needs to operate successfully in two different worlds—the home community and the White world beyond. Principals nominated teachers who had few discipline referrals, high attendance rates, and students with high standardized test scores. Ladson Billings was able to examine in depth eight of the nine teachers who were nominated by *both* parents and principals.

Culturally relevant pedagogy

Excellent teaching that supports students' cultural identities by promoting academic success, developing/maintaining cultural competence, and developing a critical consciousness to challenge the status quo.

Ladson Billings developed a conception of teaching excellence based on her research. She used the term **culturally relevant pedagogy** to describe teaching that rests on three propositions.

1. *Students must experience academic success.* "Despite the current social inequities and hostile classroom environments, students must develop their academic skills. The ways those skills are developed may vary, but all students need literacy, numeracy, technological, social, and political skills in order to be active participants in a democracy" (Ladson Billings, 1995, p. 160).
2. *Students must develop/maintain their cultural competence.* As they become more academically skilled, students still retain their cultural competence. "Culturally relevant teachers utilize students' culture as a vehicle for learning" (Ladson Billings, 1995, p. 161). For example, one teacher used rap music to teach about literal and figurative meaning, rhyme, alliteration, and onomatopoeia in poetry. Another brought in a community expert known for her sweet potato pies. Follow-up lessons included investigations of George Washington Carver's sweet potato research, numerical analyses of taste tests, marketing plans for selling pies, and research on the educational preparation needed to become a chef. In this way, pedagogies also serve to *sustain* cultural diversity.
3. *Students must develop a critical consciousness to challenge the status quo.* In addition to developing academic skills while retaining cultural competence, excellent teachers help students "develop a broader sociopolitical consciousness that allows them to critique the social norms, values, mores, and institutions that produce and maintain social inequities" (Ladson Billings, 1995, p. 162). For example, in one school, students were upset that their textbooks were out of date. They mobilized to investigate the funding formulas that allowed middle-class students to have newer books, wrote letters to the newspaper editor to challenge these inequities, and updated their texts with current information from other sources.

Ladson Billings (1995) noted that many people have said her three principles "are just good teaching." She agrees that she is describing good teaching but questions "why so little of it seems to be occurring in classrooms populated by African American students" (p. 159).

Lisa Delpit (2003) also described three steps for teaching students that are consistent with culturally relevant pedagogy. First, teachers must be convinced of the inherent intellectual capabilities, humanity, and spiritual character of their students—they must believe in the children. She has provided many examples from schools around the United States where ethnically diverse students from low-income families are reading well above grade level and doing advanced math (Delpit, 2012). When scores are low, the fault is not in the students but in their education. Second, teachers must fight the foolishness of asserting that high test scores or scripted lessons are evidence of good learning and good teaching. Successful instruction is "constant, rigorous, integrated across disciplines, connected to students' lived cultures, connected to their intellectual legacies, engaging, and designed for critical thinking and problem solving that is useful beyond the classroom" (Delpit, 2003, p. 18). Third, teachers must learn who their students are and what legacies they bring. Then,

students can explore their own intellectual legacies and understand the important reasons for academic, social, physical, and moral excellence—not just to "get a job" but also "for our community, for your ancestors, for your descendants" (p. 19). Drawing on the cultural strengths of and advantages of students whose cultures have been historically erased, such as those from indigenous communities, is one way to honor their knowledge and ways of life (Kana'iaupuni et al., 2017).

In the past, discussions about teaching low-income students and those from racial, ethnic, or linguistic minority groups have focused on remediating problems or overcoming perceived deficits. But a culturally sustaining approach conveys to students that they are fully seen within the particular struggles and oppressive forces that they face. In her book *We Want to Do More Than Survive: Abolitionist Teaching and the Pursuit of Educational Freedom*, Bettina Love (2019) emphasized that "Dark children cannot thrive without a community of love, refusal, protection, knowledge, and resource-sharing" (p. 53). Full acceptance also means acknowledging the role that racism and power have played in systems of oppression. This is not easy, particularly for White teachers for whom these ideas might be new. Becoming an "abolitionist" teacher, Love argues,

> means you are ready to lose something, you are ready to let go of your privilege, you are ready to be in solidarity with dark people by recognizing your Whiteness in dark spaces, recognizing how it can take up space if unchecked, using your Whiteness in White spaces to advocate for and with dark people. And you understand that your White privilege allows you to take risks that dark people cannot take in the fight for educational justice. (pp. 158-159)

Diversity in Learning

How might classrooms be organized to reflect the diverse ways in which students learn? Let's look at four aspects that teachers can consider to help them honor the cultural differences present in their classes: social organization, cultural values and learning preferences, sociolinguistics, and cultural discontinuity. These were first introduced by Roland Tharp (1989) and offer useful suggestions for teachers.

SOCIAL ORGANIZATION. Social structure or organization refers to the ways people interact to accomplish a particular goal. For example, the social organization of Hawaiian society depends heavily on collaboration and cooperation. Children play together in groups of friends and siblings, with older children often caring for the younger ones. When cooperative work groups of four or five boys and girls were established in Hawaiian classrooms, student learning and participation improved (Okagaki, 2001, 2006). The teacher worked intensively with one group while the children in the remaining groups helped each other. But when the same structure was tried in a Navajo classroom, students would not work together. These children are socialized to be more solitary and not to play with children of the opposite sex. By setting up same-sex working groups of only two or three Navajo students, teachers encouraged them to help each other. Providing choices and variety in grouping structures creates greater flexibility in the social organization of the classroom.

CULTURAL VALUES AND LEARNING PREFERENCES. As noted throughout this cluster, all learners (and teachers) have distinct values and preferences related to their diverse cultural backgrounds. For example, research has shown that some Hispanic American students are more oriented toward family and group loyalty. This might mean that these students prefer cooperative activities and dislike being made to compete with fellow students (Garcia, 1992; Vasquez, 1990). It might also mean that some students will behave in ways that reflect certain Latino values, such as these four identified by Dingfelder (2005):

Familismo: Tightly knit families. Discussing family problems or business might be seen as disloyal.

Simpatia: Value of interpersonal harmony. Assertively voicing personal opinions or arguing might be seen as inappropriate.

Respeto: Respect for people in authority, for example, teachers and government officials.

Personalismo: Valuing of close interpersonal relationships; discomfort with distant, cold, professional relationships.

The learning approaches of African Americans might be inconsistent with teaching approaches in some schools. For example, some student learning is facilitated by taking a visual/global approach rather than a verbal/analytic approach; a preference for reasoning by inference or improvisation rather than by formal logic; a focus on people and relationships; a preference for energetic involvement in several activities simultaneously rather than routine, step-by-step learning; a tendency to approximate numbers, space, and time; and a greater dependence on nonverbal communication. Students of color who identify with their heritage cultures might respond better to open-ended questions with more than one answer as opposed to single, right-answer questions. Questions that focus on meaning or the "big picture" might be more productive than questions that focus on details (Bennett, 2011; Gay, 2010; Sheets, 2005).

In many indigenous communities, humility and harmony are valued more than competition. Teaching and learning often take place through oral narrative forms that emphasize holistic, integrated, and "high context" ways of knowing that use cultural metaphors and imagery (Cajete, 2020). For example, research has shown that Navajo students preferred hearing a story all the way through to the end before discussing parts of the story. Teachers who stopped reading to ask comprehension questions seemed odd to these students and interrupted their learning process (Tharp, 1989). Also, these students sometimes show strong preferences for learning privately through trial and error rather than having their mistakes made public (Morgan, 2009).

But as you saw earlier, there are dangers in stereotyping any group, especially in terms of their cultural values or learning preferences. A heated debate exists today about whether identifying group differences in learning preferences is a dangerous, racist (and/or sexist, colonialist) exercise. In our society, we are quick to move from the notion of "difference" to the idea of "deficits" and stereotypes (Christopher et al., 2014). The latter view assumes that White, middle-class culture is "normal" and valuable and can lead to the perpetuation of oppressive teaching approaches that silence or erase students' ancestral and cultural roots (McIntosh, 2009; Paris, 2012; Sabzalian, 2019). The best advice for teachers is to be sensitive to individual differences in all your students and to make available alternative paths to learning. Never prejudge how a student will learn best based on assumptions about the student's ethnicity, race, or gender. Get to know the individual and get to know their culture.

Sociolinguistics
The study of the formal and informal rules for how, when, about what, to whom, and how long to speak in conversations within cultural groups.

Pragmatics
The rules for when and how to use language to be an effective communicator in a particular culture.

Participation structures
The formal and informal rules for how to take part in a given activity.

SOCIOLINGUISTICS. **Sociolinguistics** is the study of "the courtesies and conventions of conversation across cultures" (Tharp, 1989, p. 351). The classroom is a special setting for communicating; it has its own set of rules for when, how, to whom, about what subject, and in what manner to use language. To be successful, students must know these communication rules; that is, they must understand the **pragmatics** of the classroom—when, where, and how to communicate. This is not such an easy task. As class activities change, rules change. Sometimes you have to raise your hand (during the teacher's presentation), but sometimes you don't (during story time on the rug or during an experiment in the lab). Sometimes asking a question (during discussion) is good, but other times (such as when the teacher is reprimanding you), asking a question isn't so good. These differing activity rules are called **participation structures**, and they define appropriate participation for each class activity. Most classrooms have many different participation structures. To be competent communicators in the classroom, students sometimes have to read very subtle, nonverbal cues telling them which participation structures are currently in effect. For example, when the teacher moves to the whiteboard, students should look up and be ready for instructions.

Some children are simply better than others at reading classroom situations because the participation structures of the school match the structures they have learned at home (Tyler et al., 2008). The communication rules for most school situations are similar to those in middle-class homes, so children from these homes often appear to be more competent

communicators. They know the unwritten rules. However, it seems that even students who speak the same language as their teachers might still have trouble communicating and so have trouble learning school subjects.

What can teachers do? You can begin by making communication rules for activities clear and explicit. Do not assume students know what to do. Use cues to signal students when changes occur. Explain and demonstrate desired behavior. I have seen teachers show young children how to use their "inside voices," "six-inch voices," or "whisper voices." One teacher said and then demonstrated, "If you have to interrupt me while I'm working with other children, stand quietly beside me until I can help you." Be consistent in responding to students. If students are supposed to raise their hands, don't call on those who break the rules. In these ways you will help students learn the rules of communication in the school context.

CULTURAL DISCONTINUITY. What happens when students' values, participation structures, and learning preferences conflict with those espoused in mainstream school culture? After all, a value-free learning environment does not exist (Christopher et al., 2014). Kenneth Tyler and his colleagues (2008) referred to this phenomenon as *cultural discontinuity*, which they defined as "a school-based behavioral process where the cultural value-based learning preferences and practices of many ethnic minority students—those typically originating from home or parental socialization activities—are discontinued at school" (p. 281). Some learners who arrive at school have difficulty finding their own values reflected in the school culture, which is predominantly based on White, middle-class norms. Consequently, some students "learn quickly that they are expected to divorce themselves from their culture in order to be academically successful," as Christopher Emdin (2016) poignantly asserted in his book *For White Folks Who Teach in the Hood* (p. 13). What is the cost to students of being in a school culture with dissimilar values? "A loss of their dignity and a shattering of their personhood," says Emdin. "Urban youth who enter schools seeing themselves as smart and capable are confronted by curriculum that is blind to their realities and school rules that seek to erase their culture" (p. 13). Such students learn that they must conform or else risk becoming invisible and devalued in the eyes of their teachers and peers.

Lessons for Teachers: Teaching Every Student

To be effective, instruction should be coupled with humility and respect for cultural differences (Delpit, 2012). The set of cultural behaviors and values that works in one context might not work in another. That does not mean that one is correct and the other is not. How will you understand, support, and build on all the cultures of your students? Here are several general teaching principles to guide you in finding answers to these questions. See the *Guidelines: Culturally Relevant Teaching* on the next page for more ideas.

KNOW YOURSELF. We began this cluster with a bit of introspective "me" search. Doing more of this will help you to become familiar and at ease with your own racial and ethnic heritage, cultural and linguistic background, gender identity, and sexual orientation (Love, 2019). Developing an understanding of your own many identities is essential to your being able to create a safe space for students to do the same. Self-awareness also involves questioning the assumption that your values and experiences are the "norm" and therefore are the yardstick by which others should be measured. Scholars like Peggy McIntosh (2009) encourage all teachers—White teachers in particular—to explore their own varied identities. This means reflecting on the ways in which we, in our unique and intersecting racial, economic, ethnic, religious, gender, and sexual identities (to name just a few), have reaped advantages and disadvantages from the various systems of power around us. We would like to underscore this point: To varying degrees, *all people face both unearned privileges and unearned disadvantages in their lives tied to the ways their identities are* (*or are not*) *valued by others* in different contexts. Take a moment to return to the *Stop & Think* activities earlier in this cluster. How has some aspect of your identity advantaged you? How has some aspect of your identity led to disadvantages? How can this help you to understand your students' experiences?

GUIDELINES

Culturally Relevant Teaching

Experiment with different grouping arrangements to encourage social harmony and cooperation.

Examples

1. Try "study buddies" and pairs.
2. Organize heterogeneous groups of four or five.
3. Establish larger teams for older students.

Provide a range of ways to learn material to accommodate a range of learning preferences.

Examples

1. Give students verbal materials at different reading levels.
2. Offer visual materials—charts, diagrams, and models.
3. Provide audio and video for listening and viewing.
4. Set up activities and projects.

Teach classroom procedures directly, even ways of doing things that you thought everyone would know.

Examples

1. Tell students how to get the teacher's attention.
2. Explain when and how to interrupt the teacher if students need help.
3. Show which materials students can take and which require permission.
4. Demonstrate acceptable ways to disagree with or challenge another student.

Learn the meanings of your students' different behaviors.

Examples

1. Ask students how they feel when you correct or praise them. What gives them this feeling?
2. Talk to family and community members and other teachers to discover the meanings of expressions, gestures, or other responses that are unfamiliar to you.

Emphasize meaning in teaching.

Examples

1. Make sure students understand what they read.
2. Try storytelling and other modes that don't require written materials.
3. Use examples that relate abstract concepts to everyday experiences; for instance, relate negative numbers to being overdrawn in your bank account.

Get to know the customs, traditions, and values of your students.

Examples

1. Use holidays as a chance to discuss the origins and meanings of traditions.
2. Analyze different traditions for common themes.
3. Attend community fairs and festivals.

Help students detect racist, classist, sexist, and homophobic messages.

Examples

1. Analyze curriculum materials for biases.
2. Make students "bias detectives," reporting biased comments in the media.
3. Discuss the ways that students communicate biased messages about each other, and decide what should be done when this happens.
4. Capitalize on teachable moments. Discuss expressions of prejudice such as anti-Semitism or homophobia when they arise in the media, in curricular materials, or in class.

KNOW YOUR STUDENTS. We must learn who our students are and understand the legacies they bring (Delpit, 2003). Nothing you read in a cluster on cultural differences will teach you enough to understand the lives of all your students. If you can take other courses in college or read about other cultures, we encourage you to do so. But reading and studying are not enough. You will learn much more by getting to know your students. This means fully seeing your students as complex, developing, and culturally situated individuals. Get to know your students' families and communities too. Elba Reyes, a successful bilingual teacher for children with special needs, describes her approach:

> Usually I find that if you really want to know a parent, you get to know them on their own turf. This is key to developing trust and understanding the parents' perspective. First, get to know the community. Learn where the local grocery store is and what the children do after school. Then schedule a home visit at a time that is convenient for the parents. The home environment is not usually as ladened with failure. I sometimes observed the child being successful in the home, for example, riding a bicycle or helping with dinner. (Bos & Reyes, 1996, p. 349)

Try to spend time with students and parents on projects outside school. Ask parents to help in class or speak to your students about their jobs, their hobbies, or the history and heritage of their ethnic group. Don't wait until a student is in trouble to have the first meeting with a family member. Watch for and listen to the ways that your students interact in large and small groups. Have students write to you, and write back to them. Eat lunch with one or two students. Spend some nonteaching time with them.

RESPECT YOUR STUDENTS. From knowledge should come respect for your students' learning strengths—for the struggles they face and the obstacles they have overcome. Love (2019) emphasizes the importance of celebrating the full selfhood of students, particularly students of color.

> Not just their culture, language, sexuality, or current circumstances, but their entire selves, past, present, and future. Their ancestors, their family members, their friends, their religion, their music, their dress, their language, the ways that they express their gender and sexuality, and their communities must all be embraced and loved. (p. 120)

For a child, genuine acceptance is a necessary condition for developing self-esteem. Sometimes the self-image and occupational aspirations of some children actually decline in their early years in public school, probably because of the emphasis on majority culture values, accomplishments, and history. One solution is to engage in what Emdin (2016) calls "reality pedagogy—an approach to teaching and learning that has a primary goal of meeting each student on his or her own cultural and emotional turf" (p. 27). By inviting students to bring their group's culture into the classroom (in the form of literature, art, music, or any other cultural knowledge), teachers can help students maintain a sense of pride in their cultural group. This integration of culture must be more than the "tokenism" of sampling ethnic foods or wearing costumes. Students should teach and learn with others about the socially and intellectually important contributions of various groups. Many excellent references provide background information, history, and teaching strategies for different groups of students (e.g., Banks, 2014; Emdin, 2016; Gay, 2010; Irvine & Armento, 2001; Ladson Billings, 1995).

TEACH YOUR STUDENTS. The most important thing you can do for your students is teach them to read, write, speak, compute, think, and create—through constant, rigorous, culturally connected instruction (Delpit, 2003). A strong emphasis on academics and high expectations combined with caring support for students are key (Palardy, 2013). Beware of how hidden biases can creep in. Sometimes, in an attempt to be compassionate or to relieve the stress on students at risk, teachers give these students more positive feedback than they would privileged students. This well-intended but overly positive feedback can contribute to lowering expectations and reducing the academic challenge for these students (Harber et al., 2012). Too often, goals for students with low SES or from ethnic minority groups have focused

exclusively on basic skills. Students are taught words and sounds, but the meaning of the story is supposed to come later.

And finally, teach students directly about how to be students. In the early grades, this could mean directly teaching the courtesies and conventions of the classroom: how to get a turn to speak, how and when to interrupt the teacher, how to whisper, how to get help in a small group, how to give an explanation that is helpful, how to respect difference when interacting with others. In the later grades, it might mean teaching the academic language and study skills that fit your subject. You can ask students to learn "how we do it in school" without violating the third principle—respect your students. Ways of asking questions around the kitchen table at home might be different from ways of asking questions in school, but students can learn both ways without deciding that either way is superior. And you can expand ways of doing it in school to include more possibilities.

Module 7 Summary

Creating Culturally Welcoming Classrooms (pp. 75–82)

What is multicultural education? Multicultural education is a field of study designed to increase educational equity for all students. According to the multicultural ideal, America should be transformed into a society that values diversity. James Banks suggests that multicultural education has five dimensions: integrating content, helping students understand how knowledge is influenced by beliefs, reducing prejudice, creating social structures in schools that support learning and development for all students, and using teaching methods that reach all students.

What is culturally relevant pedagogy? Gloria Ladson Billings (1995, 2004) describes culturally relevant teaching that rests on three propositions: Students must experience academic success, develop/maintain their cultural competence, and develop a critical consciousness to challenge the status quo. This includes recognizing power structures and racism and the ways they have perpetuated inequalities.

What are some aspects of diversity in learning? Teachers should pay attention to the social organization and participation structures in their classrooms and teach students directly how to be successful in these structures, strategically use information about students' cultural values and learning preferences, avoid cultural discontinuities in class, and embrace themselves and their students as individuals with complex identities. These accomplishments can lead to respecting every student and teaching more effectively.

Cluster 2 Review

Key Terms

Bias
Culturally relevant pedagogy
Culture
Discrimination
Ethnic-racial identity
Ethnicity
Gender biases
Gender identity
Gender roles
Gender schemas
Intersectionality
Multicultural education
Nigrescence
Participation structures
Pragmatics
Prejudice
Race
Resistance culture
Sexual orientation
Socioeconomic status (SES)
Sociolinguistics
Stereotype
Stereotype threat

Connect and Extend to Licensure

Multiple-Choice Questions

1. Socioeconomic status and school achievement are often correlated. Which one of the following statements is NOT true regarding the relationship between SES and levels of achievement?
   - **A.** The longer a child lives in poverty, the greater the impact on achievement.
   - **B.** Children who are poor are no more likely to be kept back in school than children who are not.
   - **C.** Students of all ethnic groups with high SES generally show higher levels of achievement on test scores and stay in school longer than students with low SES.
   - **D.** Children who are poor are more likely to live in suburban and rural areas than to live in central cities.
2. Educators often assume that students are not bright because they have inadequate resources at home. This inadequacy manifests itself as a lack of familiarity with school-related activities. When this occurs, what is the likely outcome?
   - **A.** These students work harder to prove themselves to their teachers.
   - **B.** Teachers might have low expectations that have negative impacts on future academic success.
   - **C.** The students will perform poorly because they will never catch up with their peers.
   - **D.** Teachers understand that not all students will be able to achieve academically.
3. Damon, an African American student in Diane Collins's math class, pushed his math test away after a few minutes and proclaimed, "This is stupid. I don't know why we even have to do this." What is Ms. Collins most likely to think?
   - **A.** She should send Damon to the principal's office for insubordination.
   - **B.** She might have made the test too difficult for her African American students, so she should make an easier test next time.
   - **C.** Damon might be exhibiting performance-avoidance goals because he doesn't want to look dumb.
   - **D.** Damon's high self-efficacy makes him think that testing is a waste of his time.
4. To prevent gender bias in his fourth-grade classroom, Mr. Bonner used gender-free language, provided positive role models, and ensured that all his students had opportunities to engage in various activities by rotating classroom jobs and activities. His school was also experimenting with single-sex classrooms. Next year, Mr. Bonner thought he might opt to teach in one of those classrooms. Which of the following statements concerning single-sex classrooms is NOT true?
   - **A.** Single-sex classrooms have positive effects on learning, motivation, and engagement when certain conditions are met.
   - **B.** Teaching is not easier in a single-sex classroom than it is in a mixed-sex classroom.
   - **C.** Teachers must use teaching strategies that are geared specifically for students of a particular sex.
   - **D.** Students in single-sex classrooms are often less concerned about making positive impressions on peers.

Constructed-Response Questions

Case

Paulo Nzambi moved from his home in Angola to the United States in the fifth grade. Although Paulo's English and schooling were adequate in Angola, his teacher, Katie Wyant, worried about his social adjustment. His quiet demeanor and soft voice were, in many ways, the opposite of those of his male peers. Paulo appeared hesitant when interacting with her, as though he was unsure about how to behave. As the year progressed, Katie noticed that he had not made any progress in adjusting to the classroom. She decided she needed to be proactive in finding a solution.

5. To acquire a better understanding of Paulo and make school a more positive experience, what three types of relationships would assist Paulo as well as Ms. Wyant?
6. What aspects of culturally relevant teaching might Katie Wyant employ to assist Paulo Nzambi in his transition to an American classroom?

What Would They Do?

Teachers' Casebook: Conversations About Race

At the beginning of this cluster, we asked you to think critically about students who were disputing an incident involving an unarmed Black teenager and the police. As you now consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned about best practices in this or other classes? How do these ideas align with or challenge your personal philosophy of teaching?

Dr. Mari Ann Banks • System Equity Coordinator
City Schools of Decatur, Decatur, GA

The U.S. is a country scarred by its history of racism, so if we wish to be great teachers, it is essential that we either have or develop the ability to examine race with students and in our own praxis. Many of us have been indoctrinated with the belief that conversations about race are injurious and impolite. Nevertheless, the current racial climate shows us that the time for polite conversation that circumnavigates race is over. Black people are being murdered. We do much more harm in bypassing such subject matter than we will ever do by engaging students in thoughtful conversation about how we make it stop. In the U.S., race has always been the paisley elephant in the room, but it's an elephant that only White people have had the privilege to ignore while the rest of us are crushed in its wake. It's time for White people to shoulder their share of the weight. This requires active engagement. However, teachers need to be thoughtful and careful when having such conversations. That's why it's so important for us to develop our understanding of race and use appropriate discussion protocols with our students. For example, I might directly ask the Blue Lives Matter students, "What would it mean to 'Blue' lives if Black lives mattered?" Or I might provide the following journal prompt: "Police have chosen to serve and to risk their lives. Black people have no choice in being Black and do not want their lives to be at risk. Explore what these two statements mean together." After students have had time to think privately, I would facilitate discussion of these topics using one or more protocols such as "Critical Friends" or "Courageous Conversations" to help guide discussions in a healthy manner.

Amy Pochodylo • High School Science Teacher
Buckeye Valley High School, Delaware, OH

This situation is not an unusual one, so thinking about it beforehand is key to avoiding a knee-jerk, emotional response. As a teacher, I have spent time considering my own identities and the privileges that come along with those identity groups, to help me understand my own biases and blind spots. Other important pre-work that I do with my classes is to establish norms. Ideally, these norms make the classroom a safe space for every learner, and address how to have conversations that respectfully consider a range of viewpoints. As a science teacher, I try to ground everything in data. Black Lives Matter should not be a political or controversial statement, and there is so much data to support that. I would present data on the racial differences in the use of deadly force or stops by police officers to demonstrate why policing is often at the center of the conversation around Black Lives Matter. I would also use data around environmental justice movements and race-based differences in healthcare outcomes. After spending time as a class analyzing these sets of data, I would have the class work together (or in small groups) to write a claim, evidence, [and] reasoning using the data to back up the claim that Black Lives Matter. My hope would be that, by approaching this topic through the scientific practices used every day in the classroom, students could better understand the statement "Black Lives Matter" and that it isn't explicitly political. My fear as a teacher around discussing group-based identities, including race, is that I have my own set of biases and identities that will certainly lead to blind spots in my own thinking and imperfect ways of leading conversations in my classroom. While I fear saying the wrong thing and marginalizing other identities, I also believe in the importance of having these conversations in the classroom, being open about my own shortcomings, and supporting my students as they learn.

Demetrick Tensley • 9th–12th Grade Business Education and Computer Science Teacher
Seneca High School, Seneca, SC

The topics of race and policing are ubiquitous in our society. As individuals of all ages are becoming more aware of intersectionality, these conversations will spill into our classrooms. For teachers, this can feel daunting. Some might hedge and think, "This is not a part of my curriculum," and work to hide from these topics in hopes of escaping possible discomfort. That being said, the world is diversifying. The workforce will need our future graduates to be prepared to thrive in diverse teams. To establish a foundation for this end, we must cultivate an environment in our classrooms for discussing difficult topics. This situation provides an authentic opportunity to guide students in a discussion of these topics. This type of discussion will also help students to hone the essential skill of civil discourse. Teachers attempting to lead students through this type of discussion will need to take an unbiased stance, lay ground rules, and preserve healthy discussion. If teachers are uncomfortable or feel ill-prepared, school guidance counselors are an excellent resource. The prospect of a potentially contentious situation can cause fear. During preparation for a controversial discussion, I work to be both unbiased and prepared with facts/historical background. When dealing with issues at the intersection of race and policing, students can voice provocative opinions. This can make it difficult to maintain impartiality. I've found that in these situations, it is best to be prepared, listen, and look for commonalities. To continue daily toward the goal of students thriving in diverse group settings, I also try to have students complete components of the curriculum in diverse teams. Facilitating group work allows me to talk to students about the importance of understanding peers' beliefs, differences, and the need for mutual respect.

India Chambers • Kindergarten through 8th Grade Director of Academics
Northside Preparatory Academy, Cincinnati, OH

The teacher must set an expectation that the classroom is a safe environment to express one's self respectfully

and to value others' opinions. If this expectation is not in place, these difficult, uncomfortable learning conversations cannot take place. Once this expectation has been established, I would give students background stories of people around the world and have them write a journal entry as that person. This will allow them to explore other lives from a different perspective. For instance, one day we will read an excerpt from Anne Frank and note the realities of her world and experiences. Students would write a journal as Anne. Another day, they would write a journal entry as Trayvon Martin. Another day they would write it as a police officer who is trying their best to defend the community they serve while facing a difficult situation that could possibly cost someone their lives. We would do these exercises throughout the year to extend students' perspectives and allow for them to develop empathy and respect for all persons. If I knew students of color were upset about White students' comments, I would host a forum with a panel discussion with stakeholders from various backgrounds. Students, teachers, and parents would have the opportunity to ask questions that would be addressed by the panel. To acknowledge the differences and the realities of marginalized populations would be imperative, as would coming up with a solution that can take our differences and meld them into a beautifully blended school community. I'm not fearful of having conversations about race because I believe things resonate with people when they're uncomfortable, and this forces them to act and make a mental shift. Race talks are uncomfortable, but extremely important to change mentalities.

Lucy Ordaz Sanchez • 7th and 8th Grade Family and Consumer Science Teacher
Dixon Middle School, Provo, UT

I would take this opportunity in a heartbeat! I would first play the *line game*—have students stand on both sides of a line of tape and ask random questions such as "Who has a dog?" Students who have a dog step on the line. Questions could be comical at first for students [to] understand how the game works and also get them to relax a little. Then I would get more serious with the questions. Students would be able to see that they do have things in common with other students they might think are too different, as both might step onto the line after being asked, for example, "Are your parents… divorced?" After a couple of rounds of this game I would set up the classroom for all of us to be sitting in a circle (circle has no sides and symbolizes unity). I would start a discussion about the game to help them see that although they might look different, some of them have similar situations in their lives that they can relate to. In order for this activity to work I would have already spent time creating a safe environment in my classroom where students know that they are being heard, respected, valued, and seen for who they are. It is likely that some comments would trigger emotions and perhaps the desire to be hurtful or offensive, but before the discussion we would have set up some rules as a class to minimize those negative comments. My only fear in talking about race would be the reactions of the parents. I know students go home and sometimes discuss what their day was like at school. I believe that the students reflect and/or believe what is being discussed at home and sometimes as adults we forget how our words, our thoughts and actions will impact the children/youth who are watching us.

Melissa Roy • 10th Grade Reading and English Teacher
Lake Brantley High School, Altamonte Springs, FL

The majority of students in my high school remedial reading classes belong to racial and ethnic minority groups. It would be more comfortable for me as a White teacher to ignore this issue and stick with academics, for I sometimes fear saying the wrong thing and offending my students of color. Given the current social climate in the United States, however, that would be the wrong decision. Though I may not understand what it feels like to be a minority, as the adult in the room, it is my responsibility to facilitate opportunities for students to develop understanding for and empathy toward one another. This issue is far bigger than my classroom and could have lasting repercussions for students who are members of marginalized groups. From day one I create a space in which respectful discourse among students is not only allowed but also expected, and I model what that looks like for them until they learn. I offer them daily opportunities to read about the world and develop their own evidence-based opinions of different topics of interest. We engage in Socratic seminars, Harkness discussions, and other activities designed to spark conversation about topics that impact their lives. Perhaps most importantly, I encourage students to share their stories so they can get to know each other on a deeper personal level. My hope is that this will help them understand those who look, live, and believe differently than they do. I believe the most significant lessons I can teach my students are to care for others, notice when injustice happens, and stand up for those who do not have a voice. This is how we change the world!

Cluster 3

Cognitive Development



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Teachers' Casebook:

Symbols and Cymbals

What Would You Do?

The district curriculum guide calls for a unit on poetry, including lessons on *symbolism* in poems. You are concerned that many of your fourth-grade students may not be ready to understand this abstract concept. To test the waters, you ask a few students what a *symbol* is.

"It's sorta like a big metal thing that you bang together," Tracy says as she waves her hands like a drum major.

"Yeah," Sean adds, "my sister plays one in the high school band."

You realize that they are on the wrong track here, so you try again: "I was thinking of a different kind of symbol, like a ring as a symbol of marriage or a heart as a symbol of love or…."

You are met with blank stares.

Trevor ventures, "You mean like the Olympic torch?"

"And what does that symbolize, Trevor?" you ask.

Trevor replies, "Like I said, a torch," but he thinks, "Duh!"

Critical Thinking

- What do these students' reactions tell you about children's thinking?
- How would you approach this unit?
- What more would you do to "listen" to your students' thinking so that you could match your teaching to their level of thinking?
- How would you give your students concrete experiences with symbolism?
- How will you decide whether the students are developmentally ready for this material?



Overview and Objectives

What is going on with Trevor? In this cluster, you will find out. We begin with a definition of *development* and examine three basic questions. Psychologists have debated the answers to these questions for many years: nature versus nurture, continuity versus discontinuity, and critical versus sensitive periods for development. Next we look at general principles of human development that most psychologists affirm. To understand cognitive development, we begin by studying how the brain works and then explore the ideas of two of the most influential cognitive developmental theorists, Jean Piaget and Lev Vygotsky. Piaget's ideas have implications for teachers about how their students think and what they can learn. We will consider criticisms of his ideas as well. The work of Lev Vygotsky, a Russian psychologist, highlights the important roles teachers and parents play in the cognitive development of the child. Vygotsky's theory is becoming more and more influential in the field of child development. By the time you have completed this cluster, you should be able to:

3.1 Provide a definition of development that takes into account three agreed-upon principles and describe three continuing debates about development, along with current consensus on these questions.

3.2 Summarize research on the physical development of the brain and possible implications for teaching.

3.3 Explain the principles and stages presented in Piaget's theory of cognitive development, including criticisms of his theory.

3.4 Explain the principles presented in Vygotsky's theory of development, including criticisms of his theory.

3.5 Discuss implications of Piaget's and Vygotsky 's theories for teaching.

OUTLINE

Teachers' Casebook—Symbols and Cymbals: What Would You Do?
Overview and Objectives

MODULE 8: Development and the Brain: Some General Principles
A Definition of Development
Three Questions Across the Theories
General Principles of Development

The Brain and Cognitive Development
The Developing Brain: Neurons
The Developing Brain: Cerebral Cortex
Brain Development in Childhood and Adolescence
Putting It All Together: How the Brain Works
Neuroscience, Learning, and Teaching
Lessons for Teachers: General Principles

MODULE 9: Piagetian and Information Processing Theories
Piaget's Theory of Cognitive Development
Influences on Development
Basic Tendencies in Thinking
Four Stages of Cognitive Development
Some Limitations of Piaget's Theory
Information Processing, Neo-Piagetian, and Neuroscience Views of Cognitive Development

MODULE 10: Vygotsky's Sociocultural Perspective and the Implications of Piaget's and Vygotsky's Theories for Teachers
Vygotsky's Sociocultural Perspective
The Social Sources of Individual Thinking
Cultural Tools and Cognitive Development
The Roles of Language and Private Speech
The Zone of Proximal Development
Limitations of Vygotsky's Theory

Implications of Piaget's and Vygotsky's Theories for Teachers
Piaget: What Can We Learn?
Vygotsky: What Can We Learn?
An Example Curriculum: Tools of the Mind
Reaching Every Student: Teaching in the "Magic Middle"
Cognitive Development: Lessons for Teachers

Cluster 3 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Symbols and Cymbals: What Would They Do?

MODULE 8 Development and the Brain: Some General Principles

Learning Objective 3.1 Provide a definition of development that takes into account three agreed-upon principles, and describe three continuing debates about development, along with current consensus on these questions.

Learning Objective 3.2 Summarize research on the physical development of the brain and possible implications for teaching.

A Definition of Development

In the next few clusters, as we explore how children develop, we will encounter some surprising situations.

- Leah, a 5-year-old, is certain that rolling out a ball of clay into a snake creates more clay because "it's longer."
- A 9-year-old child in Geneva, Switzerland, firmly insists that being Swiss and being Genevan at the same time is impossible: "I'm already Swiss. I can't also be Genevan."

- Jamal, a very bright elementary school student, cannot answer the question "How would life be different if people did not sleep?" because he insists, "People HAVE TO SLEEP!"
- A 2-year-old brings his own mother to comfort a friend who is crying, even though the friend's mother is available, too.

What explains these interesting events? You will soon find out because you are entering the world of child and adolescent development.

The term **development** in its most general, psychological sense refers to certain changes that occur in human beings (or animals) between conception and death. The term is not applied to all changes but, rather, to those that appear in orderly ways and remain for a reasonably long period of time. A temporary change caused by a brief illness, for example, is not considered a part of development. Human development can be divided into several different aspects: **Physical development**, as you might guess, deals with changes in the body. **Personal development** is the term generally used for changes in an individual's identity and personality. **Social development** refers to changes in the way an individual relates to others. And **cognitive development** refers to changes in thinking, reasoning, and decision making.

Development
Orderly, adaptive changes we go through between conception and death; these developmental changes remain for a reasonably long period of time.

Physical development
Changes in body structure and function over time.

Personal development
Changes in personality that take place as one grows.

Social development
Changes over time in the ways we relate to others.

Many changes during development are simply matters of growth and maturation. **Maturation** refers to changes that occur naturally and spontaneously and that are, to a large extent, genetically programmed. Such changes emerge over time and are relatively unaffected by environment, except in cases of malnutrition or severe illness. Much of a person's physical development falls into this category. Other changes are brought about through learning, as individuals interact with their environments. Such changes make up a large part of a person's social development. But what about the developments of thinking and personality? Most psychologists agree that in these areas, both maturation and interaction with the environment (or *nature* and *nurture*, as they are sometimes called) are important, but they disagree about the amount of emphasis to place on each one. Nature versus nurture is one of three continuing discussions in theories of development.

Cognitive development
Gradual, orderly changes by which mental processes become more complex and sophisticated.

Maturation
Genetically programmed, naturally occurring changes over time.

Three Questions Across the Theories

Because there are many different approaches to research and theory, there also are continuing debates about key questions surrounding development.

WHAT IS THE SOURCE OF DEVELOPMENT? NATURE VERSUS NURTURE. Which is more important in development: the "nature" of an individual (heredity, genes, biological processes, maturation, etc.) or the "nurture" of environmental contexts (education, parenting, culture, social policies, etc.)? This debate has raged for at least 2,000 years and has accumulated many labels along the way, including "heredity versus environment," "biology versus culture," "maturation versus learning," and "innate versus acquired abilities." In earlier centuries, philosophers, poets, religious leaders, and politicians argued the question. Even in scientific explanations, the pendulum has swung back and forth between nature and nurture (Cairns & Cairns, 2006; Miller, 2016).

Scientists now bring new tools to the discussion because they can map genes or trace the effects of drugs on brain activity, for example (Gottlieb et al., 2006). Today the environment is seen as critical to development, but so are biological factors and individual differences. In fact, some psychologists assert that behaviors are determined 100% by biology and 100% by environment—they can't be separated (Miller, 2016). Current views emphasize complex **coactions** (joint actions) of nature and nurture. For example, a child born with a very easy going, calm disposition will likely elicit different reactions from parents, playmates, and teachers than will a child who is often upset and difficult to soothe; this shows that individuals are active in constructing their own environments. But environments shape individuals as well—if not, what good would education be? So today, the *either/or* debates about nature and

Coactions
Joint actions of individual biology and the environment—each shapes and influences the other.

nurture are of less interest to educational and developmental psychologists. As a pioneering developmental psychologist said more than 100 years ago, the more exciting questions involve understanding how "both causes work together" (Baldwin, 1895, p. 77).

WHAT IS THE SHAPE OF DEVELOPMENT? CONTINUITY VERSUS DISCONTINUITY. Is human development a continuous process of increasing abilities, or are there leaps to new stages when abilities actually change? A continuous process would be like gradual improvements in your running endurance through systematic exercise. A discontinuous change (also called *qualitative*) would be like many of the changes in humans during puberty, such as the ability to reproduce—an entirely different ability.

You can think of continuous or quantitative change like walking up a ramp to go higher and higher: Progress is steady. A discontinuous or qualitative change is more like walking up stairs: There are level periods, and then you ascend the next step all at once. Piaget's theory of cognitive development, described in the next section, is an example of *qualitative*, discontinuous change in children's thinking abilities. But other explanations of cognitive development based on learning theories emphasize gradual, continuous, *quantitative* change.

TIMING: IS IT TOO LATE? CRITICAL VERSUS SENSITIVE PERIODS. Are there critical periods during which certain abilities, such as language, need to develop? If those opportunities are missed, can the child still "catch up"? These are questions about timing and development. Many earlier psychologists, particularly those influenced by Freud, believed that early childhood experiences are critical, especially for emotional/social and cognitive development. But does early toilet training really set all of us on a particular life path? Probably not. More recent research shows that later experiences are powerful, too, and can change the direction of development. Most psychologists today talk about **sensitive periods**, not critical periods. There are "windows of opportunity"—times when a person is especially ready for or responsive to certain experiences (Scalise & Felds, 2017; Schunk, 2020).

Sensitive periods
Times when a person is especially ready to learn certain things or is responsive to certain experiences.

BEWARE OF EITHER/OR. As you might imagine, these debates about development proved too complicated to be settled by splitting alternatives into either/or possibilities (Miller, 2016). Today, most psychologists view human development, learning, and motivation as a set of interacting and coacting contexts, from the inner biological structures and processes that influence development, such as genes, cells, nutrition, and disease, to the external factors of families, neighborhoods, social relationships, educational and health institutions, public policies, time periods, historical events, and so on. So the effects of a childhood disease on the cognitive development of a child born in the 16th century to a poor family and treated by bloodletting or leeches will be quite different from the effect of the same disease on a child born in 2022 to a wealthy family and given the best treatment available for that time period. Throughout the rest of this book, we will try to make sense of development, learning, motivation, and teaching without falling into the *either/or trap*.

General Principles of Development

Although there is disagreement about exactly how development takes place, there are a few general principles that almost all theorists would support.

1. *People develop at different rates.* In your own classroom, you will have a broad range of examples of different developmental rates. Some students will be larger, better coordinated, or more mature in their thinking and social relationships. Others will be much slower to mature in these areas. Except in rare cases of very rapid or very slow development, such differences are typical and should be expected in any large group of students.
2. *Development is relatively orderly.* People develop abilities in a logical order. In infancy, they sit before they walk, babble before they talk, and see the world through their own eyes before they can begin to imagine how others see it. In school, they will master addition before algebra, Harry Potter before Shakespeare, and so on. But "orderly" does not necessarily mean "linear" or "predictable"—people might advance, stay the same for a period of time, or even go backward.

3. *Development takes place gradually.* Very rarely do changes appear overnight. A student who cannot manipulate a pencil or answer a hypothetical question may well develop this ability, but the change is likely to take time.

The Brain and Cognitive Development

If you have taken an introductory psychology class, you have read about the brain and nervous system. You probably remember that the brain has several different areas and that certain areas are involved in particular processes. For example, the *brain stem* handles basic functions such as heart rate, breathing, and blood pressure as well as levels of arousal such as sleeping and wakeful attention. The feathery-looking *cerebellum* coordinates and orchestrates balance and smooth, skilled movements—from the graceful gestures of the dancer to the everyday action of eating without stabbing yourself in the nose with a fork. The cerebellum may also play a role in higher cognitive functions such as learning. The *hippocampus* is critical in recalling new information and recent experiences and helps establish information in long-term memory, while the *amygdala* directs emotions and aggression and is important for emotional memories. Almost all sensory signals pass through the *thalamus* to affect brain activity. Also, the thalamus is involved in our ability to learn new information, particularly if it is verbal. The *corpus callosum* connects the two hemispheres of the brain to allow communication between them for complex mental processing. The *frontal lobe* is the area that sets humans apart from other animals by enabling us to process information for planning, remembering, making decisions, solving problems, and thinking creatively. Rather than being a single organ, the brain is a "society of experts" that collaborate to affect what we think and do (Gluck et al., 2020; Schunk, 2020). Figure 3.1 shows the various regions of the brain.

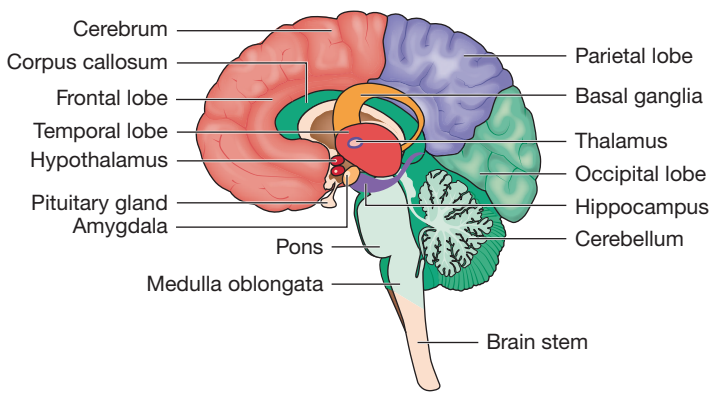
Advances in brain imaging techniques have allowed scientists remarkable access to the functioning brain. For example, **computerized axial tomography (CAT)** scans give three-dimensional images of the brain. **Positron emission tomography (PET)** scans can track brain activity amid different conditions. An **electroencephalograph (EEG)** measures electrical patterns in the brain, and **event-related potential (ERP)** uses EEG data to study the brain as people perform activities such as reading or learning vocabulary words. **Functional magnetic resonance imaging (fMRI)** shows how blood flows within the brain when children or adults do different cognitive tasks. Finally, a new approach, **near-infrared optical tomography (NIR-OT)**, uses infrared light through the scalp to assess brain activity. Table 3.1 on the next page summarizes what each of these techniques can and cannot do.

Let's begin our look at the brain by examining its tiny components: neurons, synapses, and glial cells.

The Developing Brain: Neurons

A newborn baby's brain weighs about 1 pound, barely one-third of the weight of an adult brain. But this infant brain has billions of **neurons**, the specialized nerve cells that accumulate and transmit information (in the form of electrical activity) in the brain and other

Figure 3.1 Regions of the Brain



Computerized axial tomography (CAT)
A technique that uses X-ray technology to provide enhanced, three-dimensional images of the part of the body scanned.

Positron emission tomography (PET)
A method of localizing and measuring brain activity using computer-assisted motion pictures of the brain.

Electroencephalograph (EEG)
A technique that uses electrodes attached to the scalp to measure electrical patterns in the brain created by neuron movements.

Event-related potential (ERP)
Measurements that assess electrical activity of the brain through the skull or scalp.

Functional magnetic resonance imaging (fMRI)
An MRI is an imaging technique that uses a magnetic field along with radio waves and a computer to create detailed pictures of the inside of the body. A functional MRI uses an MRI to measure the tiny changes that take place in the brain during brain activity.

Near-infrared optical tomography (NIR-OT)
A technique that uses an optical fiber to transmit near-infrared light through the scalp and into the brain. Some of the light is reflected back, indicating blood flow and oxygenation in the blood, which reveals brain activity.

Neurons
Nerve cells that store and transfer information.

Table 3.1 Brain Imaging Techniques

Advances in brain imaging have led to greater understanding of how the brain functions. Each technique can give some kinds of information but not others.

COMMON NAME	WHAT IT DOES	EXAMPLE USES	LIMITATIONS/WHAT IT CAN'T DO
CAT Scan Computerized Axial Tomography	Uses X-ray technology to provide enhanced, three-dimensional images of the brain.	Locating and studying tumors or lesions in the brain.	Cannot use too often because of radiation exposure; does not give detailed information about brain activity.
PET Scan Positron Emission Tomography	Shows the extent of activity in different parts of the brain. A small amount of radioactive glucose is injected into the body and carried to the brain. Greater brain activity in various areas uses more glucose and shows up as brighter colors on computerized brain maps.	Studying how the brain works and which areas are more or less involved in different cognitive activities such as reading; diagnosing brain diseases such as tumors, strokes, and dementia.	Because radioactive injections are needed, cannot do many sessions; because there is a brief lag, does not capture fast-paced neural activity; tells more about *where* in general the activity takes place than about *when* it does.
EEG Electroencephalograph	Uses electrodes attached to the scalp to measure electrical patterns in the brain created by neuron movements. No drugs or radiation are required.	Studying sleep disorders, epilepsy, language disorders, and cognitive load (Clusters 5 and 8).	Does not provide either two- or three-dimensional pictures of the brain; reflects activity for the whole brain and cannot show specifically where activity is occurring.
ERP Event-Related Potentials	Provides a calculation based on EEG data that reflects the brain's response to a stimulus or event.	Studying sensory and cognitive activity, especially language, as well as visual problems and brain disorders.	Is good at assessing speed of neural activity but not at identifying location.
fMRI Functional Magnetic Resonance Imaging	Shows moment-by-moment blood flow within the brain associated with neural activity when children or adults do different cognitive tasks, revealing the amount of work done in certain areas. No radiation or injections are necessary.	Studying brain processes and structures related to perception, emotion, thinking, and action; diagnosing when to use drugs to treat strokes; mapping patients' brains before surgery.	Has few limitations and has largely replaced PET scans, but there is a brief lag between changes in brain activity and the changes in blood flow picked up by the fMRI.
NIR-OT Near-Infrared Optical Tomography	Uses an optical fiber to transmit near-infrared light through the scalp and into the brain. Some of the light is reflected back, indicating blood flow and oxygenation in the blood, which reveals brain activity.	Studying brain processes and changes during particular activities, social interactions, classroom learning. Not invasive, no chemicals or radiation are used; can be mobile and used over longer periods of time.	Has few limitations, but it can detect activity only a few centimeters into the brain where the light can penetrate.

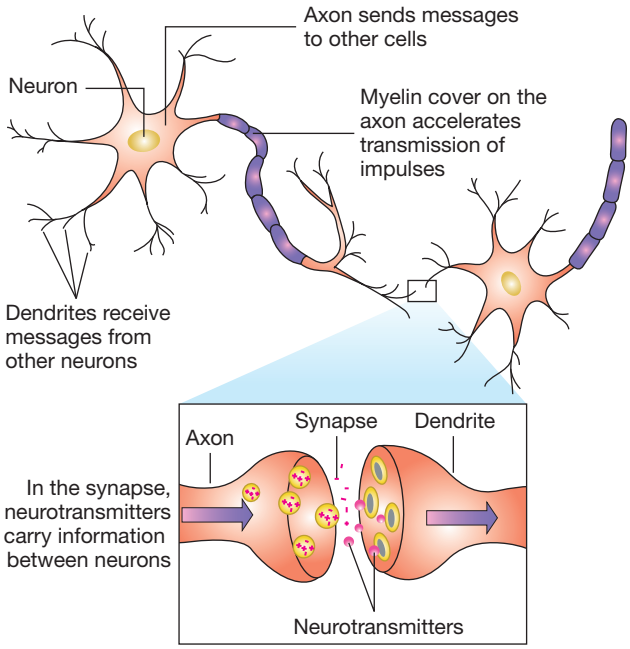
parts of the central nervous system. Neurons are a grayish color, so they sometimes are called the *gray matter* of the brain. One neuron has the information-processing capacity of a small computer. This means the processing power of one 3-pound human brain is likely greater than the power of all the computers in the world! Of course, computers do many things, like calculate square roots of large numbers, much faster than human brains can

(Anderson, 2020). These incredibly important neuron cells are tiny; about 30,000 could fit on the head of a pin (Sprenger, 2010). Scientists once believed that all the neurons a person would ever possess are present at birth, but now we know that the production of new neurons, **neurogenesis**, continues into adulthood, especially in the hippocampus region (Scalise & Felde, 2017).

Neurons come in many shapes and sizes depending on their functions, but they all have a similar structure. These cells send out long arm- and branch-like fibers, called axons and dendrites, to connect with other neuron cells. The fiber ends from different neurons don't actually touch; there are tiny spaces between them, about one-billionth of a meter in length, called **synapses**. Neurons share information by using electrical signals and by releasing chemicals that jump across the synapses. *Axons* transmit information to muscles, glands, or other neurons; *dendrites* receive information and transmit it to the neuron cells themselves. Connections between neurons via these synaptic transmissions become stronger with use or practice and weaker when not used. The neural pathways reinforced by use form memory traces that are the end result of learning (Scalise & Felde, 2017; Schunk, 2020). So the strength of these synaptic connections is dynamic—always changing as learning occurs. This is called **synaptic plasticity**, or just **plasticity**, a very important concept for educators, as you will see soon. Researchers have found that physical exercise plays a critical role in maintaining a healthy, plastic brain (Doidge, 2015; Dubinsky et al., 2013). Figure 3.2 shows these components of the neuron system.

Figure 3.2 A Single Neuron

Each neuron (nerve cell) includes dendrites that bring in messages and an axon that sends out messages. This is a single neuron, but each neuron is in a network with many others.



At birth, each of a child's approximately 100 to 200 billion neurons has about 2,500 synapses. However, the number of fibers that reach out from the neurons and the number of synapses between the fiber ends increase during the first years of life, perhaps into adolescence or longer. By ages 2 to 3, each neuron has around 15,000 synapses; children this age have many more synapses than they will have as adults. In fact, they are *oversupplied* with neurons and synapses they will need to adapt to their environments. However, only those neurons that are used will survive, and unused neurons, up to 40%, will be "pruned." This pruning is necessary and supports cognitive development. Researchers have found that some developmental disabilities are associated with a gene defect that interferes with pruning (Siegler et al., 2020).

Two kinds of overproduction and pruning processes take place. One is called *experience-expectant* because synapses are overproduced in certain parts of the brain during specific developmental periods, awaiting (expecting) stimulation. For example, during the first months of life, the brain expects visual and auditory stimulation. If a normal range of sights and sounds occurs, then the visual and auditory areas of the brain develop. But children who are born completely deaf receive no auditory stimulation, and, as a result, the auditory-processing area of their brains becomes devoted to processing visual information. Similarly, the visual-processing area of the brain for children blind from birth becomes devoted to auditory processing (Siegler et al., 2020).

Experience-expectant overproduction and pruning processes are responsible for general development in large areas of the brain and may explain why adults have difficulty with pronunciations that are not part of their native language. For example, the distinction between the sounds of *r* and *l* is important in English but not in Japanese, so by about 10 months of age, Japanese infants lose the ability to discriminate between *r* and *l; those neurons are pruned away*. As a result, Japanese adults learning these sounds require intense instruction and practice. Just think about the cognitive advantages and extra capacities of an infant growing up learning two languages (Broderick & Blewitt, 2015; Hinton et al., 2008)!

Neurogenesis
The production of new neurons.

Synapses
The tiny spaces between neurons—chemical messages are sent across these gaps.

Synaptic plasticity
The brain's tendency to remain somewhat adaptable or flexible.

Plasticity
The brain's tendency to remain somewhat adaptable or flexible.

The second kind of synaptic overproduction and pruning is called *experience-dependent*. Here, synaptic connections are formed based on the individual's experiences. New synapses are formed in response to neural activity in very localized areas of the brain. Examples are learning to ride a bike or use a spreadsheet. The brain does not "expect" these behaviors, so new synapses form in response to these experiences. Again, more synapses are produced than will be kept after "pruning." Experience-dependent processes are involved in individual learning, such as mastering unfamiliar sound pronunciations in a second language you are studying.

Stimulating environments may help in the pruning process in early life (experience-expectant period) and also may support increased synapse development in adulthood (experience-dependent period) (Broderick & Blewitt, 2015; Cook & Cook, 2014). In fact, animal studies have shown that rats raised in stimulating environments (with toys, tasks for learning, other rats, and human handling) develop and retain 25% more synapses than rats who are raised with little stimulation. Even though the research with rats might not apply directly to humans, it is clear that extreme deprivation can have negative effects on human brain development. But extra stimulation—for example, flash cards, "educational" tablets, or baby brain games—will not necessarily improve development for young children who are already getting adequate or typical amounts (Berk, 2019). So spending money on expensive toys or baby education programs probably offers more stimulation than is necessary and might be harmful. Pots and pans, blocks and books, sand and water all provide excellent, appropriate stimulation—especially if accompanied by caring conversations with parents or teachers.

Glial cells

The *white matter* of the brain. These cells greatly outnumber neurons and appear to have many functions such as fighting infections, controlling blood flow and communication among neurons, and providing the *myelin* coating around axon fibers.

Look back at Figure 3.2. It appears that there is nothing between the neurons but air. Actually, that is incorrect. The spaces are filled with **glial cells**, the *white matter* of the brain. There are trillions of these glial cells; they greatly outnumber neurons. Glial cells appear to have many functions, such as fighting infections, controlling blood flow and communication among neurons, and providing the *myelin* coating (see Figure 3.2) around axon fibers. **Myelination**, the coating of axon neuron fibers with an insulating, fatty glial covering, influences thinking and learning. This process is something like coating bare electrical wires with rubber or plastic. This myelin coating makes message transmission faster and more efficient and is important for brain functioning. For example, in multiple sclerosis the myelin coating degenerates, which leads to trouble with movements, coordination, vision, and speech. Myelination happens quickly in the early years but continues gradually into adolescence, with the child's brain doubling in volume in the first year of life and doubling again around puberty. Myelination of the areas involved in judgment and decision making, the prefrontal regions, is not complete until early adulthood—more about this later (J. R. Anderson, 2020; Gluck et al., 2020).

Myelination

The process by which neural fibers are coated with a fatty sheath called *myelin* that makes message transfer more efficient.

The Developing Brain: Cerebral Cortex

Let's move from the neuron level to the brain itself, which amazingly is almost 80% water, with the rest being fat and protein (Schunk, 2020). The outer ⅛-inch-thick covering is the cerebral cortex—the largest area of the brain. The cerebral cortex is a thin sheet of neurons that is almost 3 square feet in area for adults. To get all that area in your head, the sheet is crumpled together, with many folds and wrinkles (J. R. Anderson, 2020). In humans, this area of the brain is much larger than in lower animals. The cerebral cortex accounts for about 85% of the brain's weight in adulthood and contains the greatest number of neurons. The cerebral cortex thus allows for the greatest human accomplishments, such as complex problem solving and language.

The cortex is the last part of the brain to develop, so it is believed to be more susceptible to environmental influences than other areas of the brain. Parts of the cortex mature at different rates. The region of the cortex that controls physical motor movement matures first, then the areas that control complex senses such as vision and hearing, and last, the frontal lobe, which controls higher-order thinking processes. The temporal lobes of the cortex that play major roles in emotions, judgment, and language do not develop fully until the high school years and maybe later (Berk, 2019; Siegler et al., 2020).

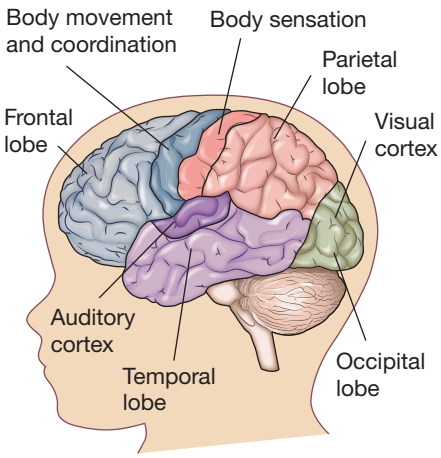
Different areas of the cortex seem to have distinct functions, as shown in Figure 3.3. Even though different functions are found in particular areas of the brain, these specialized functions are quite specific and elementary. To accomplish more complex functions such as speaking or reading, the various areas of the cortex must communicate and work together (J. R. Anderson, 2020).

Another aspect of brain functioning that has implications for cognitive development is **lateralization**, or the specialization of the two hemispheres of the brain. We know that each half of the brain controls the opposite side of the body. Damage to the right side of the brain will affect movement on the left side of the body and vice versa. In addition, certain areas of the brain affect particular behaviors. For most of us, the left hemisphere of the brain is a major factor in language processing, and the right hemisphere handles much of our spatial-visual information and emotions (nonverbal information). For some left-handed people, the relationship might be reversed, but for most left-handers, and for females on average, there is less hemispheric specialization altogether. The brains of young children show more plasticity (adaptability) because they are not as specialized or lateralized as the brains of older children and adults. Young children with damage to the left side of the brain are somewhat able to overcome the damage, which allows language development to proceed. Different areas of the brain take over the functions of the damaged area. But in older children and adults, this compensation is less likely to occur after damage to the left hemisphere (J. R. Anderson, 2020; Ormrod, 2020).

These differences in performance by the brain's hemispheres, however, are more relative than absolute; one hemisphere is just more efficient than the other in performing certain functions. Language is processed "differently, but simultaneously" by the left and right hemispheres (Alferink & Farmer-Dougan, 2010, p. 44). Nearly any task, particularly the complex skills and abilities that concern teachers, requires simultaneous participation of many different areas of the brain in constant communication with each other. For example, the left side of the brain is where grammar and syntax are understood, but the right side is better at figuring out the meaning of a story or interpreting sarcasm, irony, metaphors, or puns, so both sides of the brain have to work together when you read or make sense of literature, films, and jokes. Remember, no mental activity is exclusively the work of a single part of the brain, so there is no such thing as a "right-brained student," unless that individual has had the left hemisphere removed—a rare and radical treatment for some forms of epilepsy (Ormrod, 2020).

Figure 3.3 A View of the Cerebral Cortex

This is a simple representation of the left side of the human brain, showing the cerebral cortex. The cortex is divided into different areas, or lobes, each having a variety of regions with different functions. A few of the major functions are indicated here.



Lateralization

The specialization of the two hemispheres (sides) of the brain cortex.

Brain Development in Childhood and Adolescence

The brain continues to develop throughout childhood and adolescence. In infancy, children identify patterns in their world and in the language(s) spoken by the people who care for them. Infants learn—form neural connections and networks—by exploring, acting, and observing. They are self-directed in this adventure—which is a good thing because they have so much to learn. During this time a stimulating, responsive, and safe environment is a much better "teacher" than flashcards or structured lessons because young children follow their own interests and curiosities.

In the elementary school years, children's brains continue to grow. The different parts of the brain that support various processes such as perception, memory, and emotion become more networked and connected. These interconnections enable children to reflect on their feelings and thoughts—to think about their own thinking. Children also can add to their store of knowledge and hold more information in memory at one time. At this age they are ready to learn more vocabulary and grammar in their first language and also to learn a second language. But they still have limited attention spans, so longer lessons, activities, or directions should be divided into manageable and memorable pieces (McDevitt & Ormrod, 2020). In addition, all of the ideas in Cluster 11 for developing self-regulated learning can support elementary school students as their growing brains open new possibilities for understanding and controlling their own cognitive processes.

During adolescence, changes in the brain increase individuals' abilities to control their behavior in both low-stress and high-stress situations, to be more purposeful and organized, and to inhibit impulsive behavior (Wigfield et al., 2006). But these abilities are not fully developed until the early 20s, so adolescents may "seem" like adults, at least in low-stress situations, but their brains are not mature. They often have trouble avoiding risks and controlling impulses. This is why adolescents' brains have been described as "high horse power, poor steering" (Organisation for Economic Co-operation and Development [OECD], 2007, p. 6).

One explanation for this problem with avoiding risks and impulsive behaviors looks to differences in the pace of development for two key components of the brain—the limbic system and the prefrontal cortex of the brain (Casey et al., 2008). The limbic system, which is involved with emotions and reward-seeking/novelty/risk-taking/sensation-seeking behaviors, develops earlier. The prefrontal lobe takes more time to develop and is involved with judgment and decision making. As the limbic system matures, adolescents become more responsive to pleasure seeking and emotional stimulation. In fact, adolescents appear to need more intense emotional stimulation than either children or adults, so these young people are set up for taking risks and seeking thrills. Risk taking and novelty seeking can be positive factors for adolescent development as young people courageously try new ideas and behaviors—and learning is stimulated (Luna et al., 2013). But their less mature prefrontal lobe is not yet good at saying, "Whoa—that thrill is too risky!" So in emotional situations, thrill seeking wins out over caution, at least until the prefrontal lobe catches up and becomes more integrated with the limbic system toward the end of adolescence. Then risks can be evaluated in terms of long-term consequences, not immediate thrills (Casey et al., 2008; Smith et al., 2012). In addition, there are individual differences: Some adolescents are more prone than others to engage in risky behaviors.

Teachers can take advantage of their adolescent students' intensity by helping them devote their energy and passion to areas such as politics, the environment, public service, or social causes (Price, 2005) or by guiding them to explore emotional connections with characters in history or literature. Connections to family, school, community, and positive belief systems help adolescents "put the brakes" on reckless and dangerous behaviors (McDevitt & Ormrod, 2020).

Other changes in the neurological system during adolescence affect sleep; teenagers need about 9 hours of sleep per night, but many students' biological clocks are reset, making it difficult for them to fall asleep before midnight. Some experts interviewed by Sumathi Reddy (2014a) have recommended that ideally, high school should start at 9:00 or even 10:00 in the morning—sounds good to us! Yet in many school districts, high school begins by 7:30, which makes 9 hours of sleep impossible to get, so students are continually sleep deprived. Research in neuroscience shows that sleep deprivation impairs the initial formation of memories for facts, so learning suffers. This means that losing sleep to cram for tests actually interferes with learning by shutting down the very parts of the brain needed to remember what you are studying (Scalise & Felde, 2017). Classes that keep students in their seats taking notes for the full period may literally "put the students to sleep." With no time for breakfast and little for lunch, these students' nutritional needs are often deprived as well (Sprenger, 2005).

Putting It All Together: How the Brain Works

What is your conception of the brain? Is the brain a culture-free container that holds knowledge the same way for everyone? Is the brain like a library of facts or a computer filled with information? Do you wake up in the morning, download what you need for the day, and then go merrily on your way? Is the brain like a pipe that transfers information from one person to another—a teacher to a student, for example? Kurt Fischer—a developmental psychologist and Harvard professor—offers a different view, one based on neuroscience research. Knowing is actively constructing understandings and actions. Knowledge is based on our activities, and the brain is constantly changing. Experience shapes our brains, actually altering our neurons and their connections (Fischer, 2009). See Table 3.2 for some other myths and truths about the brain.

Table 3.2 Myths and Truths About the Brain

COMMON MYTHS	TRUTH
1. You use only 10% of your brain.	1. You use all your brain. That is why strokes are so devastating. Your brain is 2% of your body weight but uses 20% of available energy.
2. Listening to Mozart will make children smarter.	2. Listening to music won't make you smarter, but learning to play a musical instrument is associated with increased cognitive achievement.
3. Some people are more "right brained," and others are more "left brained."	3. It takes both sides of your brain to do most things.
4. A young child's brain can manage to learn only one language at a time.	4. Children all over the world can and do learn two languages at once.
5. You can't change your brain.	5. Our brains are changing all the time.
6. Damage to the brain is permanent.	6. Most people recover well from minor brain injuries.
7. Playing games like Sudoku keeps your brain from aging.	7. Playing Sudoku makes you better at playing Sudoku and similar games. Physical exercise is a better bet to prevent decline.
8. The human brain is the biggest brain.	8. Sperm whales have brains five times heavier than those of humans.
9. Alcoholic beverages kill brain cells.	9. Heavy drinking does not kill brain cells, but it can damage the nerve ends called dendrites, and this causes problems with communicating messages in the brain. This damage is mostly reversible.
10. The adolescent's brain is the same as that of an adult.	10. Critical differences between adolescents' and adults' brains exist, especially in the areas of judgment and risk assessment.
11. Students learn best with their preferred learning style.	11. Teaching according to a student's preferred style does not improve learning.
12. You can learn while you sleep.	12. Sorry, no.

Source: Based on Aamodt & Wang (2008); Fischer, (2009); Freeman (2011); Holmes (2016); Macdonald et al. (2017); Schunk (2020).

CULTURE AND BRAIN PLASTICITY. All experiences sculpt the brain—play and deliberate practice, formal and informal learning (Dubinsky et al., 2013). Earlier you encountered the term that describes the brain's capacity for constant change in neurons, synapses, and activity—*plasticity*. Cultural differences in brain activity provide examples of how interactions in the world shape the brain through plasticity. For example, in one study, when Chinese speakers added and compared Arabic numbers, they showed brain activity in the motor (movement) areas of their brains, whereas English speakers performing the same tasks had activity in the language areas of their brains (Tang et al., 2006). One explanation is that Chinese children are taught arithmetic using an abacus—a calculation tool that involves movement and spatial positions. These children retain a kind of visual-motor sense of numbers when they become adults (Varma et al., 2008). There also are cultural differences in how languages affect reading. For example, when they read, native Chinese speakers activate parts of their brains associated with spatial information processing, probably because the language characters used in written Chinese are pictures. But Chinese speakers also activate these spatial areas of the brain when they read English, demonstrating that reading proficiency can be reached through different neural pathways (Hinton et al., 2008). So, thanks to plasticity, the brain is ever changing, shaped by activity, culture, and context. We build knowledge as we do things, as we manipulate objects and ideas mentally and physically.

As you can imagine, educators have looked for and disagreed about instructional applications of neuroscience research. See the *Point/Counterpoint* on the next page.

POINT/COUNTERPOINT: Brain-Based Education

Educators are hearing more and more about brain-based education. Are there clear educational implications from the neuroscience research on the brain?

Point

No, the implications are not clear. Early on, John Bruer, president of the James S. McDonnell Foundation, wrote articles that were critical of the brain-based education craze (Bruer, 1997, 1999, 2002). He noted that many so-called applications of brain research begin with solid science but then move to unwarranted speculation and end in a sort of appealing folk tale about the brain and learning. In the title of his 1997 article, he called that journey "a bridge too far." He suggested that for each claim, the educator should ask, "Where does the science end and the speculation begin?" One claim that Bruer questioned was the notion of right-brain, left-brain learning, a popular idea that has been around for more than 30 years, in spite of the fact that neuroscientists keep debunking the claims. Even though different brain areas are specialized for different tasks, this specialization occurs at very fine levels of analysis, and forming visual images involves many parts of the brain. As we will see later in this book, imagery can be a good learning strategy—but not because it enlists the "underutilized" right brain in learning (Bruer, 1999). Kurt Fischer (2009), president of the International Mind, Brain, and Education Society, has lamented that many *neuromyths*, like those in Table 3.2 (blatantly wrong beliefs about how the brain and body work), still are widely accepted—zombie ideas that won't die.

No teacher doubts that the brain is important in learning. As Steven Pinker (2002), professor of psychology at Harvard University, observed, does anyone really think that learning takes place somewhere else, like the pancreas? But knowing that learning affects the brain does not tell us how to teach. All learning affects the brain; "this should be obvious, but nowadays any banality about learning can be dressed up in neurospeak and treated like a great revelation of science" (Pinker, 2002, p. 86). Virtually all of the so-called best practices for brain-based education are simple restatements of good teaching based on understandings of how people learn, not how their brains work. For example, we have known for more than 100 years that learning in many short practice sessions is more effective than learning in one long cramming session. Building more dendrites through short study sessions may be one of many reasons why the strategy works, but it does not offer teachers *new* strategies (Alferink & Farmer-Dougan, 2010). Have things changed lately? Jeffrey Bowers says no: "There are still no examples of EN [educational neuroscience] providing new insights to teaching in the classroom, . . . no examples of EN providing new insights to remedial instruction for individuals, and . . . no evidence that EN is useful for the diagnosis of learning difficulties" (Bowers, 2016a, p. 628). Bowers also said, "There are no examples of novel and useful suggestions for teaching based on neuroscience thus far" (2016b, p. 609), and Dougherty and Robey (2018) concluded, "The idea that neuroscience can have a direct impact in the classroom is a bit farfetched" (p. 401).

Counterpoint

Yes, teaching should be brain-based. In their article "Applying Cognitive Neuroscience Research to Education" in the *Educational Psychologist*, Tami Katzir and Juliana Paré-Blagoev (2006) concluded, "When applied correctly, brain science may serve as a vehicle for advancing the application of our understanding of learning and development. . . . Brain research can challenge common-sense views about teaching and learning by suggesting additional systems that are involved in particular tasks and activities" (p. 70). One influential commonsense view to challenge is that brain functioning is fixed early in life. In fact, when adolescents were taught about neuroplasticity and the brain's ability to change across the life span, their academic

achievement and self-concept were higher compared to their peers who did not receive that message (Howard-Jones et al., 2016). There is also promising work on very early detection of brain indicators for later risks of learning problems such as dyslexia. Early detection would allow early intervention (Thomas, 2019).

If we are to guard against overstating the links between brain research and education, then we should not ask *whether* to teach neuroscience to preservice teachers but, instead, *how* best to do that teaching (Dubinsky et al., 2013). Several universities, including Harvard, Cambridge, Dartmouth, the University of Texas at Arlington, University of Minnesota, University of Southern California, Beijing Normal University, Southeast University in Nanjing, and Johns Hopkins are pioneering this process. They have established training programs for educators in brain-education studies (Dubinsky et al., 2013; Fischer, 2009; Wolfe, 2010). Other educational psychologists have called for a new professional specialty—neuro-educators (Beauchamp & Beauchamp, 2013). If you want to learn more about the brain and learning, many online sources provide courses and information for educators. Two good ones are the Science of Learning course offered by Future Learn (http://www.futurelearn.com/courses/science-of-learning) and Neuroscience & the Classroom: Making Connections, offered by Annenberg Learner (http://www.learner.org/courses/neuroscience).

In his presidential address for the First Conference of the International Mind, Brain, and Education Society, Kurt Fischer (2009) also noted that the primary goal of that organization is to ground education in solid research from biology, cognitive science, development, and education while preventing myths and popular misconceptions. Fischer makes the point that we can go from understanding how the brain works to understanding cognitive processes and then to developing educational practices. But jumping directly from knowledge about the brain to educational practices probably involves too much speculation—a bridge too far. Even enthusiastic supporters believe that educational neuroscience does not claim a direct link between measures of brain functioning and teaching practices. Instead, educational neuroscience and teaching should work together to develop and test different practices (Howard-Jones et al., 2016).

Beware of Either/Or

Few educators have a background in neurobiology, and most neuroscientists can't create concrete and useful applications of research on the brain because they just don't know enough about the specifics of teaching in kindergarten to high school classrooms (Beauchamp & Beauchamp, 2013). Insights from studies of the brain can likely produce medical treatments for educational problems, such as drugs that act on the brain to help with attention-deficit disorder. Teaching approaches for students with attention-deficit disorder can be powerful, but they grow from educational psychology research, not from medical research (Bowers, 2016a). However, to ignore what we do know about the brain would be irresponsible. Brain-based learning offers some direction for educators who want more purposeful, informed teaching. At the very least, the neuroscience research is helping us understand why effective teaching strategies, such as distributed practice, work. The person in the best position to create, invent, and apply strategies is the teacher who understands both the way the brain works and the way children learn (Scalise & Felde, 2017).

For more information, see the following podcast on understanding the brain: http://www.oecd.org/edu/ceri/understandingthebrainthebirthofalearningscience.htm.

Neuroscience, Learning, and Teaching

In 2017, Richard Mayer noted that only six articles out of 9,000 in the *Journal of Educational Psychology* database contain the words *brain* or *neuroscience*. Why so few? As you saw in the *Point/Counterpoint*, there has been vigorous debate between the enthusiastic educational advocates of brain-based education and the skeptical neuroscience researchers who caution that studies of the brain do not really address major educational questions yet.

DOES INSTRUCTION AFFECT BRAIN DEVELOPMENT? There are differences in brain activity associated with instruction. For example, the intensive instruction and practice provided to rehabilitate stroke victims can help them regain functioning by forming new connections and using new areas of the brain (Bransford et al., 2000; McKinley, 2011). In a dramatic example of how teaching can affect brain development, K. W. Fischer (2009) describes two children who each had one brain hemisphere removed as a treatment for severe epilepsy. Nico's right hemisphere was removed when he was 3, and his parents were told he would never have good visual-spatial skills. However, with strong and constant support and teaching, Nico grew up to be a skilled artist! Brooke's left hemisphere was removed when he was 11. His parents were told he would lose his ability to talk. Again, with strong support, he regained enough speaking and reading abilities to finish high school and attend community college.

THE BRAIN AND LEARNING TO READ. Brain-imaging research is revealing interesting differences between skilled and less-skilled readers as they learn new vocabulary. For example, one imaging study showed that less-skilled readers had trouble establishing high-quality representations of new vocabulary words in their brains, as indicated by ERP measurements of electrical activity of the brain. When they later encountered one of the new words, less-skilled readers' brains often didn't recognize that they had seen the word before even though they had learned it in an earlier lesson. If words you have learned previously seem unfamiliar later, you can see why it would be hard to understand what you read (Balass et al., 2010).

Reading is not innate or automatic—every brain has to be taught how to read (Frey & Fisher, 2010). Reading is a complex integration of the systems in the brain that recognize sounds, written symbols, meanings, and sequences and then connect those things with what the reader already knows. This has to happen quickly and automatically (Wolf et al., 2009). What are some strategies suggested? Use multiple approaches that teach sounds, spelling, meanings, sequencing, and vocabulary through reading, writing, discussing, explaining, drawing, and modeling. Different students may learn in different ways, but all students need practice in literacy.

EMOTIONS, LEARNING, AND THE BRAIN. Finally, another clear connection between the brain and classroom learning is in the area of emotions and stress. Let's step inside a high school math classroom described by Christine Hinton and her colleagues (2008, p. 91) for an example:

> Patricia, a high school student, struggles with mathematics. The last few times she answered a mathematics question she got it wrong and felt terribly embarrassed, which formed an association between mathematics… and negative emotions.… Her teacher had just asked her to come to the blackboard to solve a problem. This caused an immediate transfer of this emotionally-charged association to the amygdala, which elicits fear. Meanwhile, a slower, cortically-driven cognitive appraisal of the situation is occurring: she remembers her difficulty completing her mathematics homework last night, notices the problem on the board contains complicated graphs, and realizes that the boy she has a crush on is watching her from a front-row seat. These various thoughts converge to a cognitive confirmation that this is a threatening situation, which reinforces her progressing fear response and disrupts her ability to concentrate on solving the mathematics problem.

In Cluster 7 you will learn about how emotions can become paired with particular situations, and in Cluster 12 you will see that anxiety interferes with learning, whereas challenge, interest, and curiosity can support learning. If students feel unsafe and anxious, they are not likely to be able to focus their attention on academics. But if students are not challenged or interested, learning suffers too. Keeping the level of challenge and support "just right" is not simple for teachers. And helping students learn to regulate their own emotions and motivation is an important goal for education (see Cluster 11). Simply put, learning will be more effective "if educators help to minimize stress and fear at school, teach students

emotional regulation strategies, and provide a positive learning environment that is motivating to students" (Hinton et al., 2008).

Stop & Think As a teacher, you don't want to fall for overly simplistic "brain-based" teaching slogans. But obviously, the brain and learning are intimately related—this is not a surprise. So how can you be a savvy, "neuroscientific" teacher (Murphy & Benton, 2010)?

Lessons for Teachers: General Principles

What can we learn from neuroscience? One overarching idea is that teachers and students should transform the notion of learning from "using your brain" to "changing your brain"—embrace the amazing plasticity of the brain (Howard-Jones et al., 2016). Here are some general teaching implications drawn from Brown et al. (2014), Driscoll (2005), Dubinsky, et al. (2013), Murphy and Benton (2010), Sprenger (2010), Scalise and Felde (2017), and Schunk (2020).

1. Human capabilities—intelligence, communication, problem solving, and so on—emerge from each person's unique synaptic activity overlaid on his or her genetically endowed brain anatomy; nature and nurture are in constant activity together. The brain can place some limits on learning in the form of genetic brain anomalies in neural wiring or structure, but learning can occur via alternate pathways in the brain (as Nico and Brooke demonstrate). So *there are multiple ways both to teach and to learn a skill*, depending on the student.
2. *Many cognitive functions are differentiated*; they are associated with different parts of the brain. Using a range of modalities for instruction and activities that draw on different senses may support learning—for example, using maps and songs to teach geography. Using different modalities also helps students stay focused and engaged. Assessment should be differentiated, too.
3. *The brain is relatively plastic*, so enriched, active environments and flexible instructional strategies are likely to support cognitive development in young children and learning in adults. The brain is constantly changing at many levels, from cells to connections to remapping skills in new areas in response to an injury—think plasticity!
4. *Changing the brain takes time*, so teachers must be consistent, patient, and compassionate in teaching and reteaching in different ways, as Nico's and Brooke's parents and teachers could tell you. Don't overwhelm the brain with a heavy cognitive load (see Cluster 8) that presents too much too quickly. Give students ways of managing the cognitive load using graphic organizers, visuals, tables, glossaries, notes, and other "external brain" tools.
5. *Some learning disorders may have a neurological basis*; neurological testing can assist in diagnosing and treating these disorders as well as in evaluating the effects of various treatments.
6. Learning from *real-life problems and concrete experiences* helps students construct knowledge and also gives them multiple pathways for learning and retrieving information. Knowledge learned should be clearly connected with situations in which it is useful. "Inert" knowledge that is memorized but not used is quickly forgotten. Results of both research on learning and research on the brain support using problem-based learning, simulations and role plays, active discussions, graphics, and visuals.
7. *Our brains are wired to be curious* as we attempt to make sense of all the incoming sensory information. Harnessing this curiosity can engage and motivate students.
8. *The brain seeks meaningful patterns and connections with existing networks*, so teachers should tie new information to what students already understand and help them form new connections. Use both concrete and abstract examples when possible, and ask students to think of their own examples. Information that is not linked to existing

knowledge will be easily forgotten. Help students recognize patterns by pointing out similarities and differences and teaching them how to detect patterns.

9. Because the brain naturally looks for patterns and makes predictions about what to expect, *feedback is critical* because feedback is a form of evidence that helps the brain correct and improve its predictions.
10. *It takes a long time and extensive practice to build and consolidate knowledge*. Changing the brain (learning) benefits from elaborating, extending, and applying concepts in different situations and academic subjects over time and revisiting the applications often. Probing questions, worked-out examples, annotated and carefully labeled charts and graphs, reflection, and asking students to explain new learning to themselves and each other all help.
11. *Large, general concepts should be emphasized over small, specific facts* so students can build enduring, useful knowledge categories and associations that are not constantly changing.
12. *Stories should be used in teaching*. Stories engage many areas of the brain—memories, experiences, feelings, and beliefs. Stories also are organized and have a sequence—beginning, middle, and end—which makes them easier to remember than unrelated or unorganized information.
13. *Emotions and health affect learning*—positive emotions can support learning and memory, whereas negative emotions can interfere. Emotions also are related to motivation, as you will see in Cluster 12. Stress, lack of sleep, poor nutrition, and lack of exercise all can affect the brain's ability to learn.
14. Helping students understand how activity (distributed practice, problem solving, making connections, inquiry, etc.) changes their brain and how emotions and stress affect attention and memory can be motivating, leading to greater self-efficacy and self-regulated learning. (We talk more about this in Cluster 11.) One important message to students is that *they are responsible for doing what it takes to change their own brains; they have to work (and play) to learn*.

For the rest of the cluster, we turn from the brain and cognitive development to examine several major theories of cognitive development, the first one offered by a biologist turned psychologist, Jean Piaget.

Module 8 Summary

A Definition of Development (pp. 88–91)

What are the different kinds of development? Human development can be divided into physical development (changes in the body), personal development (changes in an individual's personality), social development (changes in the way an individual relates to others), and cognitive development (changes in thinking).

What are three questions about development and three general principles? For decades, psychologists and the public have debated whether development is shaped more by nature or nurture, whether change is a continuous process or involves qualitative differences or stages, and whether there are critical times for the development of certain abilities. We know today that these simple either/or distinctions cannot capture the complexities of human development. Coactions and interactions are the rule. Theorists generally agree that people develop at different rates, that development is an orderly process, and that development takes place gradually.

The Brain and Cognitive Development (pp. 91–102)

What part of the brain is associated with higher mental functions? The cortex is a crumpled sheet of neurons that serves three major functions: receiving signals (such as visual or auditory signals) from the sense organs, controlling voluntary movements, and forming connections. The part of the cortex that controls physical motor movement develops or matures first, then the areas that control complex senses such as vision and hearing, and last, the frontal lobe, which controls higher-order thinking processes.

What is lateralization, and why is it important? Lateralization is the specialization of the two sides, or hemispheres, of the brain. For most people, the left hemisphere is the major factor in language, and the right hemisphere is prominent in spatial and visual processing. Even though certain functions are associated with particular parts of the brain, the various parts and systems of the brain work together to learn and perform complex activities such as reading and constructing understanding.

What are some implications for teachers? Recent advances in both teaching methods and discoveries in the neurosciences provide exciting information about brain activity during learning and brain activity differences among people with varying abilities and challenges and from different cultures. These findings have some basic implications for teaching, but many of the strategies offered by "brain-based" advocates are simply good teaching. Perhaps we now know more about why these strategies work.

MODULE 9 Piagetian and Information Processing Theories

Learning Objective 3.3 Explain the principles and stages presented in Piaget's theory of cognitive development, including criticisms of his theory.

Piaget's Theory of Cognitive Development

Swiss psychologist Jean Piaget was a true prodigy. In fact, in his teens, he published so many scientific papers on mollusks (marine animals such as oysters, clams, octopuses, snails, and squid) that he was offered a job as the curator of the mollusk collection at the Museum of Natural History in Geneva. He told the museum officials that he wanted to finish high school first. For a while, Piaget worked in Alfred Binet's laboratory in Paris developing intelligence tests for children. The reasons children gave for their wrong answers on these tests fascinated him. What were they thinking? That question intrigued him for the rest of his life. He continued to write until his death at the age of 84 (Green & Piel, 2010; Miller, 2016).

During his long career, Piaget devised a model describing how humans go about making sense of their world by gathering and organizing information (Piaget, 1954, 1963, 1970a, 1970b). He studied a wide range of topics including the development of scientific and mathematical reasoning, moral judgments, language, drawing, cause and effect, concepts of time and number, and memory for past events, to name just a few. Piaget really started the field of cognitive development. He is still studied today because his insights about children's thinking ring so true and provide such a good description of the development of thinking from infancy to adulthood (Siegler et al., 2020).

Put Yourself in a Child's Place Can you be in Pittsburgh, Pennsylvania, and in the United States at the same time? Is this a difficult question for you? How long did it take you to answer?

According to Piaget (1954), certain ways of thinking that are quite simple for an adult, such as the Pittsburgh question in *Put Yourself in a Child's Place*, are not so straightforward for a child. For example, do you remember the 9-year-old child at the beginning of the cluster who was asked if he could be Genevan? He answered, "No, that's not possible. I'm already Swiss. I can't also be Genevan" (Piaget, 1965/1995, p. 252). Imagine teaching this student geography. He has trouble classifying one concept (Geneva) as a subset of another

(Switzerland). There are other differences between adult and child thinking. Children's concepts of time may be different from your own. They may think, for example, that they will someday catch up to a sibling in age, or they might confuse the past and the future. Let's examine why.

Influences on Development

Cognitive development is much more than the addition of new facts and ideas to an existing store of information. According to Piaget, our thinking processes change radically, though slowly, from birth to maturity because we constantly strive to make sense of the world. Piaget identified four factors—biological maturation, activity, social experiences, and equilibration—that interact to influence changes in thinking (Piaget, 1970a). *Maturation* is the unfolding of the biological changes that are genetically programmed. Parents and teachers have little impact on this aspect of cognitive development, except to be certain that children get the nourishment, sleep, and care they need to be healthy. With physical maturation comes the increasing ability to act on the environment and learn from it. When a young child's coordination is reasonably developed, for example, the child can discover principles about balance by walking on a low balance beam or a curb. Thus, physical and mental *activity*—exploring, testing, observing, and eventually organizing information—changes our thinking processes. Our cognitive development also is influenced by *social transmission*, or learning from others. Without social transmission, we would need to reinvent all the knowledge already offered by our culture. The amount people can learn from social transmission varies according to their stage of cognitive development. We'll return to a discussion of the fourth influence on thinking, *equilibration*, in the next section.

Maturation, activity, and social transmission all work together to influence cognitive development. How do we respond to these influences?

Basic Tendencies in Thinking

Organization
Ongoing process of arranging information and experiences into mental systems or categories. Ordered and logical network of relations.

Adaptation
Adjustment to the environment.

As a result of his early research in biology, Piaget concluded that all species inherit two basic tendencies, or "invariant functions." The first of these tendencies is toward **organization**—the combining, arranging, recombining, and rearranging of behaviors and thoughts into coherent systems. The second tendency is toward **adaptation**, or adjusting to the environment.

ORGANIZATION. People are born with a tendency to organize their thinking processes into psychological structures—systems for understanding and interacting with the world. Simple structures are continually combined and coordinated to become more sophisticated and thus more effective. Very young infants, for example, can either look at an object or grasp it when it comes in contact with their hands. They cannot coordinate looking and grasping at the same time. As they develop, however, infants organize these two separate behavioral structures into a coordinated, higher-level structure of looking at, reaching for, and grasping the object. They can, of course, still use each structure separately (Miller, 2016; Siegler et al., 2020).

Piaget gave a special name to these psychological structures: **schemes**. In his theory, schemes are the basic building blocks of thinking. They are organized systems of actions or thoughts that allow us to mentally represent or "think about" the objects and events in our world. Schemes can be very small and specific—for example, the sucking-through-a-straw scheme or the recognizing-a-rose scheme. Or they can be larger and more general—for example, the drinking scheme or the gardening scheme.

Schemes
Mental systems or categories of perception and experience.

ADAPTATION. In addition to the tendency to organize psychological structures, people also inherit the tendency to adapt to their environment. Two basic processes are involved in adaptation: assimilation and accommodation.

Assimilation involves trying to understand something new by fitting it into what we already know—by using our existing schemes. At times, we may have to distort the new information to make it fit. For example, the first time many children see a raccoon, they call it a "kitty." They try to match the new experience with an existing scheme for identifying animals.

Accommodation occurs when we must change existing schemes to respond to a new situation. If we cannot make new data fit any existing schemes, then we must develop more appropriate structures. We adjust our thinking to fit the new information, instead of adjusting the information to fit our thinking. Children demonstrate accommodation when they add the scheme for recognizing raccoons to their other systems for identifying animals.

People adapt to their increasingly complex environments by using existing schemes whenever these schemes work (assimilation) and by modifying and adding to their schemes when something new is needed (accommodation). In fact, both processes are required most of the time. Even using an established pattern such as sucking through a straw requires some accommodation if the straw is of a different size or length than the type you are used to. If you have ever tried drinking juice from box packages, you know that you have to add a new skill to your sucking-through-a-straw scheme: Don't squeeze the box, or you will shoot juice through the straw, straight up into the air, and into your lap. Whenever new experiences are assimilated into an existing scheme, the scheme is enlarged and changed somewhat, so assimilation involves some accommodation (Siegler et al., 2020).

Sometimes, neither assimilation nor accommodation is used. If people encounter something that is too unfamiliar, they might ignore it. Experience is filtered to fit the kind of thinking a person is doing at a given time. For example, if you overhear a conversation in a foreign language, you probably will not try to make sense of the exchange unless you have some knowledge of the language.

Assimilation
Fitting new information into existing schemes.

Accommodation
Altering existing schemes or creating new ones in response to new information.

EQUILIBRATION. According to Piaget, organizing, assimilating, and accommodating can be viewed as a kind of complex balancing act. In his theory, the actual changes in thinking take place through the process of **equilibration**—the act of searching for a balance. Piaget assumed that people continually test the adequacy of their thinking processes in order to achieve that balance. Briefly, the process of equilibration works like this: If we apply a particular scheme to an event or situation and the scheme works, then equilibrium exists. If the scheme does not produce a satisfying result, then **disequilibrium** exists, and we become uncomfortable. This motivates us to keep searching for a solution through assimilation and accommodation, and thus our thinking changes and moves ahead. Of course, the level of disequilibrium must be just right or optimal—too little and we aren't interested in changing, too much and we may be discouraged or anxious and not change. Piaget thought that interactions with peers the same age are more likely to provoke disequilibrium than interactions with older children or adults because children will accept the ideas of older people but will question and think deeply about the ideas of children their own age (Siegler et al., 2020).

Equilibration
Search for mental balance between cognitive schemes and information from the environment.

Disequilibrium
In Piaget's theory, the "out-of-balance" state that occurs when an individual realizes that his or her current ways of thinking are not working to solve a problem or understand a situation.

Four Stages of Cognitive Development

Now we turn to the actual differences that Piaget hypothesized for children as they grow. Piaget believed that all people pass through the same four stages in exactly the same order. The stages are generally associated with specific ages, but these are only general guidelines, not labels for all children of a certain age. Piaget noted that individuals may go through long periods of transition between stages and that a person could show characteristics of one stage in one situation but show traits of a higher or lower stage in other situations. Therefore, remember that knowing a student's age is never a guarantee that you will know how the child thinks (Orlando & Machado, 1996). Table 3.3 summarizes the stages.

Table 3.3 Piaget's Stages of Cognitive Development

STAGE	APPROXIMATE AGE	CHARACTERISTICS
Sensorimotor	0–2 years	Learns through reflexes, senses, and movements—actions on the environment. Begins to imitate others and remember events; shifts to symbolic thinking. Comes to understand that objects do not cease to exist when they are out of sight—object permanence. Moves from reflexive actions to intentional activity.
Preoperational	Begins about the time the child starts talking to about 7 years old	Develops language and begins to use symbols to represent objects. Has difficulty with past and future—thinks in the present. Can think through operations logically in one direction. Has difficulties understanding the point of view of another person.
Concrete Operational	Begins about first grade to early adolescence, around 11 years old	Can think logically about concrete (hands-on) problems. Understands conservation and organizes things into categories and in series. Can reverse thinking to mentally "undo" actions. Understands past, present, and future.
Formal Operational	Adolescence to adulthood	Can think hypothetically and deductively. Thinking becomes more scientific. Solves abstract problems in logical fashion. Can consider multiple perspectives and develops concerns about social issues, personal identity, and justice.

Sensorimotor
Involving the senses and motor activity.

Object permanence
The understanding that objects have a separate, permanent existence.

Goal-directed actions
Deliberate actions toward a goal.

INFANCY: THE SENSORIMOTOR STAGE. The earliest period is called the **sensorimotor** stage because the child's thinking involves seeing, hearing, touching, tasting, moving, and so on. During this period, infants develop **object permanence**, the understanding that objects exist in the environment whether they perceive the objects or not. This is the beginning of the important ability to construct a mental representation. As most parents discover, before infants develop object permanence, taking something away from them is relatively easy. The trick is to distract them and remove the object while they are not looking—"out of sight, out of mind." The older infant who searches for the ball that has rolled out of sight is indicating an understanding that objects still exist even when they are not in view (Berk, 2019).

A second major accomplishment in the sensorimotor period is the beginning of logical, **goal-directed actions**. Think of the familiar clear plastic container baby toy with a lid and several colorful items inside that can be dumped out and replaced. A 6-month-old baby is likely to become frustrated trying to get to the toys inside. An older child who has mastered the basics of the sensorimotor stage will probably be able to deal with the toy in an orderly fashion by building a "container toy" scheme: (a) get the lid off, (b) turn the container upside down, (c) shake the container if the items jam, and (d) watch the items fall. Separate, lower-level schemes have been organized into a higher-level scheme to achieve a goal.

The child is soon able to reverse this action by refilling the container. Learning to reverse actions is a basic accomplishment of the sensorimotor stage. As we will soon see, however, learning to reverse thinking—that is, learning to imagine the reverse of a sequence of actions—takes much longer.

EARLY CHILDHOOD TO THE EARLY ELEMENTARY YEARS: THE PREOPERATIONAL STAGE. By the end of the sensorimotor stage, the child can use many action schemes. However, as long as these schemes remain tied to physical actions, they are of no use in recalling the past, keeping track of information, or planning. For this, children need what Piaget called **operations**, or actions that are carried out and reversed *mentally* rather than physically. At the **preoperational** stage, the child is moving toward mastery but has not yet mastered these mental operations (which means thinking is *pre*operational).

According to Piaget, the first type of thinking that is separate from action involves making action schemes symbolic. The ability to form and use symbols—words, gestures, signs, images, and so on—is thus a major accomplishment of the preoperational period and moves children closer to mastering the mental operations of the next stage. This ability to work with symbols to represent an object that is not present, such as using the word *horse* or a picture of a horse or even pretending to ride a broomstick horse, is called the **semiotic function**. In fact, children's earliest use of symbols is in pretending—pretending to drink from an empty cup, showing that they know what the object is for. This behavior also shows that their schemes are becoming more general and less tied to specific actions. The drinking scheme, for example, can be used in playing "tea time." During the preoperational stage, that very important symbol system, language, also rapidly develops. Between the ages of 2 and 4, most children enlarge their vocabularies from about 200 to about 2,000 words.

As the child moves through the preoperational stage, the developing ability to think about objects in symbolic form remains somewhat limited to thinking in one direction only, or using one-way logic. "Thinking backward," or imagining how to reverse the steps in a task, is very difficult for the child. **Reversible thinking** is involved in many tasks that are difficult for the preoperational child, such as the conservation of matter.

Conservation is the principle that the amount or number of something remains the same even if the arrangement or appearance is changed, as long as nothing is added and nothing is taken away. You know that if you tear a piece of paper into several pieces, you will still have the same amount of paper. To prove this, you know that you can reverse the process by taping the pieces back together, but a child using preoperational thinking can't think that way. Here is a classic example of difficulty with conservation: Leah, a 5-year-old, is shown two identical glasses, both short and wide in shape. Both have exactly the same amount of colored water in them. She agrees that the amounts are "the same." The experimenter then pours the water from one of the glasses into a taller, narrower glass and asks, "Now, does one glass have more water, or are they the same?" Leah responds that the tall glass has more water because "It goes up more here" (she points to the higher level on the taller glass). Piaget's explanation for Leah's answer is that she is focusing, or *centering*, her attention on the dimension of height. She has difficulty considering more than one aspect of the situation at a time (height and width), or **decentering**. Thus, children at the preoperational stage have trouble freeing themselves from their own immediate perceptions of how the world appears.

This brings us to another important characteristic of the preoperational stage. Preoperational children, according to Piaget, have a tendency to be **egocentric**, to see the world and the experiences of others from their own viewpoint. This is one reason it is difficult for preoperational children to understand that *your* right hand is not on the same side as theirs when you are facing them. The concept of egocentrism, as Piaget intended it, does not mean "selfish"; it simply means children often assume everyone else shares their feelings, reactions, and perspectives. For example, the 2-year-old at the beginning of this cluster who brought his own mother to comfort a distressed friend—even though the friend's mother was available—was simply seeing the situation through his own eyes and providing for his friend what he would want for himself.

Research has shown that young children are not totally egocentric in every situation, however. Children as young as age 2 use more details when describing a situation

Operations
Actions an individual carries out by thinking them through instead of literally performing the actions.

Preoperational
The stage before a child masters logical mental operations.

Semiotic function
The ability to use symbols—language, pictures, signs, or gestures—to represent actions or objects mentally.

Reversible thinking
Thinking backward, from the end to the beginning.

Conservation
Principle that some characteristics of an object remain the same despite changes in its appearance.

Decentering
Focusing on more than one aspect at a time.

Egocentric
Assuming that others experience the world the way you do.

to a parent who was not present than they provide to the parent who experienced the situation with them. So young children do seem quite able to take the needs and different perspectives of others into account, at least in certain situations (Flavell et al., 2002). And in fairness to young children, even adults can make assumptions that others feel or think like they do—consider all the politicians who believe "the people agree with me!" The *Guidelines: Family and Community Partnerships* give ideas for working with preoperational thinkers and for guiding families in supporting the cognitive development of their children.

Concrete operations
Mental tasks tied to concrete objects and situations.

LATER ELEMENTARY TO THE MIDDLE SCHOOL YEARS: THE CONCRETE-OPERATIONAL STAGE. Piaget coined the term **concrete operations** to describe this stage of "hands-on" thinking. The basic characteristics of the stage are the recognition of the logical stability of the physical world, the realization that elements can be changed or transformed and still conserve many of their original characteristics, and the understanding that these changes can be reversed.

GUIDELINES

Family and Community Partnerships

Helping Families Care for Preoperational Children

Encourage families to use concrete props and visual aids whenever possible.

Examples

1. When family members use words such as *part, whole*, or *one half*, encourage them to demonstrate using objects in the house such as cutting an apple or pizza into parts.
2. Let children add and subtract with sticks, rocks, or colored chips. This technique also is helpful for early concrete-operational students.

Make instructions relatively short—not too many steps at once. Use actions as well as words.

Examples

1. When giving instructions, such as how to feed a pet, first model the process, and then ask the child to try it.
2. Explain a game by acting out one of the parts.

Help children develop their ability to see the world from someone else's point of view.

Examples

1. Ask children to imagine "how your sister felt when you broke her toy."
2. Be clear about rules for sharing or using materials. Help children understand the value of the rules, and work with them to develop empathy by asking them to think about how they would like to be treated. Avoid long lectures on "sharing" or being "nice."

Give children a great deal of hands-on practice with the skills that serve as building blocks for more complex skills such as reading comprehension or collaboration.

Examples

1. Provide cut-out letters or letter magnets on the refrigerator for building words.
2. Do activities that require measuring and simple calculations—cooking, dividing a batch of popcorn equally.

Provide a wide range of experiences in order to build a foundation for concept learning and language.

Examples

1. Take trips to zoos, gardens, theaters, and concerts; encourage storytelling.
2. Give children words to describe what they are doing, hearing, seeing, touching, tasting, and smelling.

Look at Figure 3.4 to see examples of the different tasks given to children to assess their understanding of conservation. According to Piaget, the ability to solve conservation problems depends on having an understanding of three basic aspects of reasoning: identity, compensation, and reversibility. With a complete mastery of **identity**, the child knows that if nothing is added or taken away, the material remains the same. With an understanding of **compensation**, the child knows that an apparent change in one direction can be compensated for by a change in another direction—that is, if the glass is narrower, the liquid will rise higher in the glass. And with an understanding of **reversibility**, the child can mentally cancel out the change that has been made. Leah apparently knew that it was the same water (identity), but she lacked compensation and reversibility, so she was still moving toward conservation.

Another important operation mastered at this stage is **classification**. This operation depends on a student's ability to focus on a single characteristic of objects in a set (e.g., color) and group the objects according to that characteristic. More advanced classification at this stage involves recognizing that one class fits into another. A city can be in a particular state or province and also be in a particular country, as you probably knew when we

Identity
Principle that an individual or object remains the same over time.

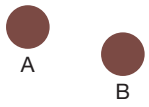
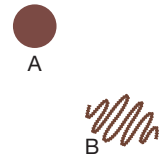
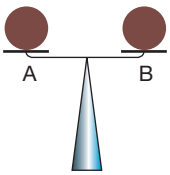
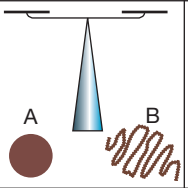
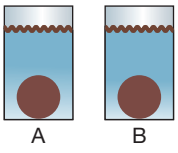
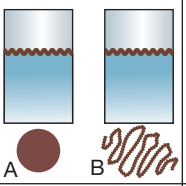
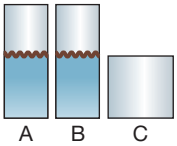
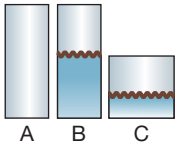
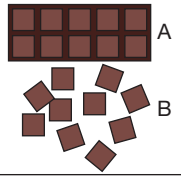
Compensation
The principle that changes in one dimension can be offset by changes in another dimension.

Reversibility
A characteristic of Piagetian logical operations—the ability to think through a series of steps and then mentally reverse the steps and return to the starting point; also called reversible thinking.

Classification
Grouping objects into categories.

Figure 3.4 Some Piagetian Conservation Tasks

In addition to the tasks shown here, other tasks involve the conservation of number, length, weight, and volume. These tasks are all achieved during the concrete-operational period.

	Suppose you start with this	→	Then you change the situation to this	→	The question you would ask a child is
(a) conservation of mass		Roll out clay ball B			Which is bigger, A or B?
(b) conservation of weight		Roll out clay ball B			Which will weigh more, A or B?
(c) conservation of volume		Take clay ball out of water and roll out clay ball B			When I put the clay back into the water beakers, in which beaker will the water be higher?
(d) conservation of continuous quantity		Pour water in beaker A into beaker C			Which beaker has more liquid, B or C?
(e) conservation of number		Break candy bar B into pieces			Which is more candy, A or B?

Source: Woolfolk, A., & Perry, N. E., *Child Development* (2nd ed.), © 2015 by Pearson Education, Inc. Reproduced by permission of Pearson Education, Inc. All rights reserved.

asked you earlier about Pittsburgh, Pennsylvania, USA. As children apply this advanced classification to locations, they often become fascinated with "complete" addresses such as Lee Jary, 5116 Forest Hill Drive, Richmond Hill, Ontario, Canada, North America, Northern Hemisphere, Earth, Solar System, Milky Way, Universe. Classification is also related to reversibility. The ability to reverse a process mentally allows the concrete-operational student to see that there is more than one way to classify a group of objects. The student understands, for example, that shapes can be classified by color and then reclassified by size or by the number of sides.

Seriation
Arranging objects in sequential order according to one aspect, such as size, weight, or volume.

Seriation is the process of making an arrangement of items in order from large to small or vice versa. This understanding of sequential relationships permits a child to construct a logical series in which A < B < C (A is less than B is less than C) and so on. Unlike the preoperational child, the concrete-operational child can grasp the notion that B can be larger than A but still smaller than C.

In any grade you teach, knowledge of concrete-operational thinking will be helpful (see *Guidelines: Teaching the Concrete-Operational Child*). In the early grades, the students are moving toward this logical system of thought. In the middle grades, the system is in full flower, ready to be applied and extended by your teaching. Students in high school and even adults still commonly use concrete-operational thinking, especially in areas that are new or unfamiliar to them.

GUIDELINES

Teaching the Concrete-Operational Child

Continue to use concrete props and visual aids, especially when dealing with sophisticated material.

Examples

1. Use timelines in history and three-dimensional models in science.
2. Use diagrams to illustrate hierarchical relationships such as branches of government and the agencies under each branch.

Continue to give students a chance to manipulate and test objects.

Examples

1. Set up simple scientific experiments such as the following involving the relationship between fire and oxygen: What happens to a flame when you blow on it from a distance? (If you don't blow it out, the flame gets larger briefly because it has more oxygen to burn.) What happens when you cover the flame with a jar?
2. Have students make candles by dipping wicks in wax, weave cloth on a simple loom, bake bread, set type by hand, or do other craft work that illustrates the daily occupations of people in the colonial period.

Make sure presentations and readings are brief and well organized.

Examples

1. Assign stories or books with short, logical clusters, moving to longer reading assignments only when students are ready.
2. Break up a presentation, giving students an opportunity to practice the first steps before introducing the next steps.

Use familiar examples to explain more complex ideas.

Examples

1. Compare students' lives with those of characters in a story. After the class reads *Island of the Blue Dolphins* (the true story of a girl who grew up alone on a deserted island), ask, "Have you ever had to stay alone for a long time? How did you feel?"
2. Teach the concept of area by having students measure two schoolrooms that are different sizes.

Give opportunities to classify and group objects and ideas on increasingly complex levels.

Examples

1. Give students slips of paper with individual sentences written on each slip, and ask the students to group the sentences into paragraphs.
2. Compare the systems of the human body to other kinds of systems: the brain to a computer, the heart to a pump. Break down stories into components from the broad to the specific: author, story, characters, plot, theme, place, time.

Present problems that require logical, analytical thinking.

Examples

1. Discuss open-ended questions that stimulate thinking: "Are the brain and the mind the same thing?" "How should the city deal with stray animals?" "What is the largest number?"
2. Use sports photos or pictures of crisis situations (Red Cross helping in disasters, victims of poverty or war, older adults who need assistance) to stimulate problem-solving discussions.

HIGH SCHOOL AND COLLEGE: FORMAL OPERATIONS. With the abilities to handle operations such as conservation, classification, and seriation, the student at the concrete-operational stage has finally developed a complete and very logical system of thinking, but this thinking is still tied to physical reality and the way things actually are. The student is not yet able to reason about hypothetical, abstract problems that involve the coordination of many factors at once. Such coordination is part of Piaget's final stage of cognitive development, **formal operations**. At this stage the focus of thinking can shift from *what is* to *what might be*. Situations do not have to be experienced to be imagined.

Formal operations
Mental tasks involving abstract thinking and coordination of several variables.

You met Jamal at the beginning of this cluster. Even though he is a bright elementary school student, he could not answer the question "How would life be different if people did not have to sleep?" because he insisted, "People HAVE TO SLEEP!" In contrast, the adolescent who has mastered formal operations can consider contrary-to-fact questions. In answering, the adolescent demonstrates the hallmark of formal operations—**hypothetico-deductive reasoning**. The formal-operational thinker can consider a hypothetical situation (people do not sleep) and reason *deductively* (from the general assumption to specific implications, such as longer workdays, more money spent on energy and lighting, smaller houses without bedrooms, or new entertainment industries). Formal operations also include *inductive* reasoning, or using specific observations to identify general principles. For example, the economist observes many specific changes in the stock market and attempts to identify general principles about economic cycles from this information.

Hypothetico-deductive reasoning
A formal-operations problem-solving strategy in which an individual begins by identifying all the factors that might affect a problem and then deduces and systematically evaluates specific solutions.

Using formal operations is a new way of reasoning that involves "thinking about thinking" or "mental operations on mental operations" (Inhelder & Piaget, 1958). For example, the child using concrete operations can categorize animals by their physical characteristics or by their habitats, but a child using formal operations can perform "second-order" operations on these category operations to *infer relationships between* habitat and physical characteristics—such as understanding that the physical characteristic of thick fur on animals is related to their arctic habitats (Kuhn & Franklin, 2006). Abstract formal-operational thinking is necessary for success in many advanced high school and college courses. Most math is concerned with hypothetical situations, assumptions, and givens: "Let $x = 10$" or "Assume $x^2 + y^2 = z^2$" or "Given two sides and an adjacent angle. . . ." Work in social studies and literature requires abstract thinking, too: "What did President Wilson mean when he called World War I the 'war to end all wars'?" "What

Connect and Extend to PRAXIS II®

Reasoning (II, A1)

Be able to distinguish between inductive and deductive reasoning. Explain the role that each plays in the learning of concepts.

are some metaphors for hope and despair in Shakespeare's sonnets?" "What symbols of old age does T. S. Eliot use in *The Waste Land*?" "How do animals symbolize human character traits in Aesop's fables?"

Stop & Think You are packing for a long trip but want to pack light. How many different three-piece outfits (pants, shirt, jacket) will you have if you include three shirts, three pairs of pants, and three jackets (assuming, of course, that they all go together in fashion perfection)? Time yourself to see how long it takes you to arrive at the answer.

The organized, scientific thinking of formal operations requires that individuals systematically generate all possibilities for a given situation. If asked the preceding *Stop & Think* question, a person using formal operations can identify all 27 possible combinations. (Did you get it right?) A concrete-operational thinker might name just a few combinations, using each piece of clothing only once.

Adolescent egocentrism
Assumption that everyone else shares one's thoughts, feelings, and concerns.

Another characteristic of this stage is **adolescent egocentrism**. Unlike egocentric young children, adolescents do not deny that other people may have different perceptions and beliefs; adolescents just become very focused on their own ideas and thoughts. This leads to what Elkind (1981) calls the sense of an *imaginary audience*—the feeling that everyone is watching: "Everyone noticed that I wore this shirt twice this week!" "The whole class thought my answer was dumb!" You can see that social blunders or imperfections in appearance can be devastating if "everyone is watching." Luckily, this feeling of being "on stage" seems to peak in early adolescence by age 14 or 15, although in unfamiliar situations we all might feel our mistakes are being broadcast for everyone to see.

The ability to think hypothetically, consider alternatives, identify all possible combinations, and analyze their own thinking has some interesting consequences for adolescents. Because they can think about worlds that do not exist, they often become interested in science fiction. Because they can reason from general principles to specific actions, they often are critical of people whose actions seem to contradict their principles. Adolescents can deduce the set of "best" possibilities and imagine ideal worlds (or ideal parents and teachers, for that matter). This explains why many students at this age develop interests in utopias, political causes, and social issues. Adolescents also can imagine many possible futures for themselves and may try to decide which is best. Feelings about any of these ideals can be strong.

DO WE ALL REACH THE FOURTH STAGE? Most psychologists agree that there is a level of thinking more sophisticated than concrete operations, but do we all reach that level? The first three stages of Piaget's theory are forced on most people by physical realities: Objects really are permanent. The amount of water doesn't change when poured into another glass. Formal operations, however, are not as closely tied to the physical environment. Being able to use formal operations may be the result of practice in solving hypothetical problems and using formal scientific reasoning—abilities that are valued and taught in literate cultures in high school and college. But even in these cultures, not all high school students or adults can perform Piaget's formal-operational tasks (Shayer, 2003). Formal thinking might develop only in areas where adolescents and adults have experience or interest or take advanced classes (Piaget, 1974; Siegler et al., 2020). So expect many students in your middle school or high school classes to have trouble thinking hypothetically, especially when they are learning something new. Students sometimes find shortcuts for dealing with problems that are beyond their grasp; they may memorize formulas or lists of steps. These systems might be helpful for passing tests, but real understanding will take place only when students can go beyond this superficial use of memorization. The *Guidelines: Helping Students Use Formal Operations* on the next page will help you support the development of formal operations in your students.

GUIDELINES

Helping Students Use Formal Operations

Continue to use concrete-operational teaching strategies and materials.

Examples

1. Use visual aids such as charts and illustrations as well as somewhat more sophisticated graphs and diagrams, especially when the material is new.
2. Compare the experiences of characters in stories to students' experiences.

Give students opportunities to explore many hypothetical questions.

Examples

1. Have students write position papers and then exchange these papers with the opposing side to debate topical social issues such as the environment, the economy, and national health insurance.
2. Ask students to write about their personal visions of a utopia; write a description of a universe that has no sex differences; write a description of Earth after humans are extinct.

Give students opportunities to solve problems and reason scientifically.

Examples

1. Set up group discussions in which students design experiments to answer questions.
2. Ask students to justify two different positions on animal rights with logical arguments for each position.

Whenever possible, teach broad concepts, not just facts, using materials and ideas relevant to the students' lives (Delpit, 1995).

Examples

1. When discussing the Civil War, consider racism or other issues that have divided the United States since then.
2. When teaching about poetry, let students find lyrics from popular songs that illustrate poetic devices, and then discuss how these devices do or don't work well to communicate the meanings and feelings the songwriters intended.

Some Limitations of Piaget's Theory

Although most psychologists agree with Piaget's insightful descriptions of *how* children think, many disagree with his explanations of *why* thinking develops as it does.

THE TROUBLE WITH STAGES. Some psychologists have questioned the existence of four separate stages of thinking even though they agree that children do go through the changes that Piaget described (Mascolo & Fischer, 2005; Miller, 2016). One problem with the stage model is the lack of consistency in children's thinking. For example, children can conserve number (the number of blocks does not change when they are rearranged) a year or two before they can conserve weight (the weight of a ball of clay does not change when you flatten it). Why can't they use conservation consistently in every situation?

Another problem with the idea of separate stages is that the processes may be more continuous than they seem. Changes seem like discontinuous, qualitative leaps when we look across longer time periods. The 3-year-old persistently searching for a lost toy seems qualitatively different from the infant who doesn't miss a toy or search when the toy rolls under a sofa. But if we watched a developing child very closely and observed moment-to-moment or hour-to-hour changes, we might see gradual, continuous changes. The older child knows that the toy is under the sofa because her more developed memory allows her to remember seeing it roll there, whereas the infant can't hold on to that memory. The longer you require children to wait before searching—the longer you make them remember the object—the older they have to be to succeed (Siegler et al., 2020).

Change can be both continuous and discontinuous, as described by a branch of mathematics called *catastrophe theory.* Changes that appear sudden, like the collapse of a bridge, are preceded by many slowly developing changes such as gradual, continuous corrosion of the metal structures. Similarly, gradually developing changes in children can lead to large changes in abilities that seem abrupt (Bjorklund, 2012; Siegler et al., 2020). In fairness, we should note that in his later work, even Piaget put less emphasis on *stages* of cognitive development and gave more attention to how thinking *changes* through equilibration (Miller, 2016).

UNDERESTIMATING CHILDREN'S ABILITIES. It now appears that Piaget underestimated the cognitive abilities of children, particularly younger ones. The problems he gave young children may have been too difficult and the directions too confusing. His subjects may have understood more than they could demonstrate when solving these problems. For example, work by Gelman and her colleagues (Gelman, 2000; Gelman & Cordes, 2001) shows that preschool children know much more about the concept of number than Piaget thought, even if they sometimes make mistakes or get confused. As long as preschoolers work with only three or four objects at a time, they can tell that the number remains the same even if the objects are spread far apart or clumped close together. Mirjam Ebersbach (2009) demonstrated that most of the German kindergartners in her study considered all three dimensions—width, height, and length—when they estimated the volume of a wooden block (actually, how many small cubes would make bigger blocks of different sizes). In other words, we might be born with a greater store of cognitive tools than Piaget suggested. Some basic understandings or core knowledge, such as the permanence of objects or the sense of number, may be part of our evolutionary equipment, ready for use in our cognitive development (Berk, 2019; Woodward & Needham, 2009).

Finally, Piaget argued that the development of cognitive operations such as conservation or abstract thinking cannot be accelerated. He believed that children had to be developmentally ready to learn. Quite a bit of research, however, has shown that with effective instruction, children can learn to perform cognitive operations such as conservation. They do not have to naturally discover these ways of thinking on their own. Knowledge and experience in a situation affect the kind of thinking that children can do (Brainerd, 2003).

COGNITIVE DEVELOPMENT AND CULTURE. One final criticism of Piaget's theory is that it overlooks the important effects of a child's cultural and social groups. Research across different cultures, however, has generally confirmed that Piaget was accurate about the sequence of the stages in children's thinking. The difference is that in some cultures, the age ranges for the stages varied. Western children typically move to the next stage about 2 to 3 years earlier than children in non-Western societies (Siegler et al., 2020). But careful research has shown that these differences across cultures depend on the subject or domain tested and whether the culture values and teaches knowledge in that domain. For example, children in Brazil who sell candy in the streets instead of attending school appear to fail a certain kind of Piagetian task—class inclusion. (Are there more daisies, more tulips, or more flowers in the picture?) But when the tasks are phrased within concepts they understand—selling candy—then these children perform better than Brazilian children of the same age who attend school (Saxe, 1999). When a culture or context emphasizes a particular cognitive ability, children growing up in that culture tend to acquire that ability sooner. In a study that compared Chinese first-, third-, and fifth-grade students to American students in the same grades, the Chinese students mastered a Piagetian task that involved distance, time, and speed relationships about 2 years ahead of American students, most likely because the Chinese education system puts more emphasis on math and science in the early grades (Zhou et al., 2001).

Even concrete operations such as classification might develop differently in different cultures. For example, when individuals from the Kpelle people of Africa were asked to sort 20 objects, they created groups that made sense to them—a hoe with a potato, a knife with an orange. The experimenter could not get the Kpelle to change their categories; they said this way of sorting is how a wise man would do it. Finally, the experimenter asked in desperation, "Well, how would a fool do it?" They promptly created the four neat classification piles the experimenter had expected—food, tools, and so on (Rogoff & Morelli, 1989).

Information Processing, Neo-Piagetian, and Neuroscience Views of Cognitive Development

As you will see in Cluster 8, there are explanations for why children have trouble with conservation and other Piagetian tasks. These explanations focus on the development of information-processing skills, such as attention, memory capacity, and learning strategies. As children mature and their brains develop, they are better able to focus their attention, process information more quickly, hold more information in memory, and use thinking strategies more easily and flexibly (Berk, 2019; Siegler, 2004). One critical development is improvement in executive functioning. **Executive functioning** involves all those cognitive processes that we use to organize, coordinate, and perform goal-directed, intentional actions such as focusing attention, inhibiting impulsive responses, making and changing plans, organizing, and using memory to hold and manipulate information (Best & Miller, 2010; Morgan et al., 2019). As children develop more sophisticated and effective executive functioning skills, they are active in advancing their own development: They are constructing, organizing, and improving their own knowledge and strategies (Siegler et al., 2020). For example, one classic Piagetian task is to show children 10 daisies and 2 roses and then ask whether they see more daisies or more flowers. Young children see more daisies and jump to the answer "daisies." As they mature, children are better at resisting (inhibiting) that first response based on appearances and can answer based on the fact that both daisies and roses are flowers. But even adults have to take a fraction of a second to resist the obvious, so inhibiting impulsive responses is important for developing complex knowledge throughout life (Borst et al., 2013).

Executive functioning
All those processes that we use to organize, coordinate, and perform goal-directed, intentional actions, including focusing attention, inhibiting impulsive responses, making and changing plans, and using memory to hold and manipulate information.

Some developmental psychologists have formulated **neo-Piagetian theories** that retain Piaget's insights about children's construction of knowledge and the general trends in children's thinking but add findings from cognitive neuroscience and information processing theories about the role of attention, memory, and strategies (Bjorklund, 2018). Perhaps the best-known neo-Piagetian theory was developed by Robbie Case (1992, 1998). He devised an explanation of cognitive development suggesting that children develop in stages within specific domains such as numerical concepts, spatial concepts, social tasks, storytelling, reasoning about physical objects, and motor development. As children practice using the schemes in a particular domain (e.g., using counting schemes in the number concept area), accomplishing the schemes requires less attention and working memory space. The schemes become more automatic because the child does not have to "think so hard." This frees up mental resources and memory to do more, so the child can combine simple schemes into more complex ones and invent new schemes when needed—assimilation and accommodation in action (Siegler et al., 2020).

Neo-Piagetian theories
More recent theories that integrate findings about attention, memory, and strategy use with Piaget's insights about children's thinking and the construction of knowledge.

Kurt Fischer (2009) connected cognitive development in different domains to research on the brain. Even though children may follow different pathways as they master skills in speaking, reading, and mathematics, their growth patterns show a similar series of spurts, and they go through predictable levels of development. When learning a new skill, children move through three tiers—from *actions* to *representations* to *abstractions*. Within each tier, the pattern moves from accomplishing a single action to mapping or coordinating two actions together, such as coordinating addition and multiplication in math, to creating whole systems of understanding. At the level of abstractions, children finally move to constructing explanatory principles. This might remind you of sensorimotor, concrete operations, and formal operations in Piaget's theory. For each skill level, the brain reorganizes itself, too. In this process, skills develop sooner at each level with the chance to practice and with quality support. Support and practice are keys in another explanation of cognitive development we discuss next—Vygotsky's theory.

Module 9 Summary

Piaget's Theory of Cognitive Development (pp. 103–115)

What are the main influences on cognitive development? Piaget's theory of cognitive development is based on the assumption that people try to make sense of the world and actively create knowledge through direct experiences with objects, people, and ideas. Maturation, activity, social

transmission, and the need for equilibrium all influence cognitive development. In response to these influences, thinking processes and knowledge develop through changes in the organization of thought (the development of schemes) and through adaptation—including the complementary processes of assimilation (incorporating into existing schemes) and accommodation (changing existing schemes).

What is a scheme? Schemes are the basic building blocks of thinking. They are organized systems of actions or thought that allow us to mentally represent or "think about" the objects and events in our world. Schemes may be very small and specific (grasping, recognizing a square), or they may be larger and more general (using a map in a new city). People adapt to their environment as they increase and organize their schemes.

As children move from sensorimotor to formal-operational thinking, what are the major changes? Piaget believed that young people pass through four stages as they develop: sensorimotor, preoperational, concrete-operational, and formal-operational. In the sensorimotor stage, infants explore the world through their senses and motor activity, and they work toward mastering object permanence and performing goal-directed activities. In the preoperational stage, symbolic thinking and logical operations begin. Children in the stage of concrete operations can think logically about tangible situations and can demonstrate conservation, reversibility, classification, and seriation. The ability to perform hypothetico-deductive reasoning, coordinate a set of variables, and imagine other worlds marks the stage of formal operations.

How do neo-Piagetian and information processing views explain changes in children's thinking over time? Information processing theories focus on attention, memory capacity, learning strategies, and other processing skills to explain how children develop rules and strategies for making sense of the world and solving problems. Neo-Piagetian approaches also look at attention, memory, and strategies and at how thinking develops in different domains such as numbers or spatial relations. Research in neuroscience suggests that when learning a new skill, children move through three tiers—from *actions* to *representations* to *abstractions*. Within each tier, the pattern involves moving from accomplishing a single action to mapping or coordinating two actions together, such as coordinating addition and multiplication in math, to creating whole systems of understanding.

What are some limitations of Piaget's theory? Piaget's theory has been criticized because children and adults often think in ways that are inconsistent with the notion of invariant stages. It also appears that Piaget underestimated children's cognitive abilities; he insisted that children could not be taught the operations of the next stage but had to develop them on their own. Alternative explanations place greater emphasis on children's developing information processing skills and the ways teachers can enhance their development. Piaget's work is also criticized for overlooking cultural factors in child development.

MODULE 10 Vygotsky's Sociocultural Perspective and the Implications of Piaget's and Vygotsky's Theories for Teachers

Learning Objective 3.4 Explain the principles presented in Vygotsky's theory of development, including criticisms of his theory.

Learning Objective 3.5 Discuss implications of Piaget's and Vygotsky 's theories for teaching.

Vygotsky's Sociocultural Perspective

Psychologists today recognize that culture shapes cognitive development by determining what and how a child will learn about the world—the content and processes of thinking. For example, cultures that prize cooperation and sharing teach these abilities early, whereas cultures that encourage competition nurture competitive skills in their children.

The stages observed by Piaget are not necessarily "natural" for all children because to some extent, the stages reflect the expectations and activities of Western cultures, as the Kpelle people described earlier have taught us (Kozulin, 2003; Kozulin et al., 2003; Rogoff, 2003).

A major spokesperson for this **sociocultural theory** (also called *sociohistoric theory*) was a Russian Jewish psychologist who was born the same year as Piaget—1896. Lev Semenovich Vygotsky was only 37 when he died of tuberculosis, but during his brief life he produced more than 100 books and articles. Some of the translations are now available (e.g., Vygotsky, 1978, 1986, 1987a, 1987b, 1987c, 1993, 1997). Vygotsky began studying learning and development to improve his own teaching. He went on to write about language and thought, the psychology of art, learning and development, and educating students with special needs. His work was banned in Russia for many years because he referenced Western psychologists in his writings. But in the past 50-plus years, with the rediscovery of his work, Vygotsky's ideas have become major influences in psychology and education and have provided alternatives to many of Piaget's theories (Gredler, 2012; Moll, 2014; Van Der Veer, 2007; Wink & Putney, 2002).

Sociocultural theory
Emphasizes role in development of cooperative dialogues between children and more knowledgeable members of society. Children learn the culture of their community (ways of thinking and behaving) through these interactions.

Vygotsky believed that human activities take place in cultural settings and that they cannot be understood apart from these settings. Instead of being little scientists constructing understandings on their own, as Piaget described, Vygotsky believed that children construct the skills needed for living in their particular culture with the support of other people eager to help them learn. So one of Vygotsky's key ideas was that our specific mental structures and processes can be traced to our interactions with others. These social interactions are more than simple influences on cognitive development—they actually create our cognitive structures and thinking processes. In fact, "Vygotsky conceptualized development as the transformation of socially shared activities into internalized processes" (John-Steiner & Mahn, 1996, p. 192). We develop by internalizing our culture. We will examine three themes in Vygotsky's writings that explain how social processes form learning and thinking: the social sources of individual thinking; the role of cultural tools in learning and development, especially the tool of language; and the zone of proximal development (Berger, 2018; Gredler, 2012; Siegler et al., 2020).

The Social Sources of Individual Thinking

Vygotsky assumed that:

> Every function in a child's cultural development appears twice: first, on the social level and later on the individual level; first between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. *All the higher functions originate as actual relations between human individuals*. (Vygotsky, 1978, p. 57; our emphasis)

In other words, higher mental processes, such as directing your own attention and thinking through problems, first are *co-constructed* during shared activities between the child and another, more skilled person such as a parent, older sibling, or teacher. Then these **co-constructed processes** are internalized by the child and become part of that child's cognitive development (Gredler, 2009a, 2009b; Mercer, 2013). For example, children first use language in activities with others to try to regulate their own behavior ("No nap!" or "I wanna cookie."). Later, however, the children can regulate their own behavior using private speech ("careful—don't spill"), as you will see in a later section. So, for Vygotsky, social interaction was more than influence: It was the origin of higher mental processes such as problem solving. Other people guiding the child become mentors in an *apprenticeship of thinking* (Vygotsky, 2012). Consider this example:

Co-constructed process
A social process in which people interact and negotiate (usually verbally) to create an understanding or to solve a problem. The final product is shaped by all participants.

> A six-year-old has lost a toy and asks her father for help. The father asks her where she last saw the toy; the child says "I can't remember." He asks a series of

> questions—did you have it in your room? Outside? Next door? To each question, the child answers, "no." When he says "in the car?" she says "I think so" and goes to retrieve the toy. (Tharp & Gallimore, 1988, p. 14)

Who remembered? The answer is really neither the father nor the daughter but the two together. The remembering and problem solving were co-constructed—between people—in the interaction. But the child (and the father) may have internalized strategies to use the next time something is lost. At some point, the child will be able to function independently to solve this kind of problem. So, like the strategy for finding the toy, higher functions appear first between a child and a "teacher" before they exist within the individual child (Kozulin, 2003; Kozulin et al., 2003; Miller, 2016).

Here is another example of the social sources of individual thinking. Richard Anderson and his colleagues (2001) studied how fourth-graders in small-group classroom discussions *appropriate* (take for themselves and use) argument stratagems that occur in the discussions. An *argument stratagem* is a particular form such as "I think [POSITION] because [REASON]," where the student fills in the position and the reason. For example, a student might say, "I think that the wolves should be left alone because they are not hurting anyone." Another strategy form is "If [ACTION], then [BAD CONSEQUENCE]," as in "If they don't trap the wolves, then the wolves will eat the cows." Other forms manage participation, for example, "What do you think, [NAME]?" or "Let [NAME] talk."

Anderson's research identified 13 forms of talk and argument that helped to manage the discussion, get everyone to participate, present and defend positions, and handle confusion. The use of these different forms of talking and thinking *snowballed*: After a useful argument was employed by one student, it spread to other students, and the argument stratagem appeared more and more in the discussions. Open discussions—students asking and answering each other's questions—were better than teacher-dominated discussion for the development of these argument forms. Over time, these ways of presenting, attacking, and defending positions could be internalized as mental reasoning and decision making for the individual students.

Both Piaget and Vygotsky emphasized the importance of social interactions in cognitive development, but Piaget saw a different role for interaction: He believed that interaction encourages development by creating disequilibrium—that is, cognitive conflict motivated change. As we saw earlier, Piaget believed that the most helpful interactions are those with peers because peers are on an equal basis and can challenge each other's thinking. Vygotsky, on the other hand, suggested that children's cognitive development is fostered by interactions with people who are more capable or advanced in their thinking—people such as parents and teachers. Of course, students can learn from both adults and peers, and today, computers can play a role in supporting communication across distances or in different languages.

Cultural Tools and Cognitive Development

Cultural tools
The real tools (computers, scales, etc.) and symbol systems (numbers, language, graphs) that allow people in a society to communicate, think, solve problems, and create knowledge.

Vygotsky believed that **cultural tools**, including technical tools (e.g., printing presses, plows, rulers, abacuses, graph paper—today, we would add mobile devices, computers, the Internet, real-time translators for mobile devices and chats, search engines, digital organizers and calendars, assistive technologies for students with learning challenges, etc.) and psychological tools (signs and symbol systems such as numbers and mathematical systems, Braille and sign language, maps, works of art, codes, and language) play very important roles in cognitive development. For example, as long as the culture provides only Roman numerals for representing quantity, certain ways of thinking mathematically—from long division to calculus—are difficult or impossible. But if a number system has a zero, fractions, positive and negative values, and an infinite quantity of numbers, then much more is possible. The number system is a psychological tool that supports learning and cognitive development—it changes the thinking process.

This symbol system is passed from adult to child and from child to child through formal and informal interactions and teachings.

TECHNICAL TOOLS IN A DIGITAL AGE. The use of technical tools such as calculators and spell checkers has been somewhat controversial in education. Technology is increasingly "checking up" on us. We rely on the spell checker in our word-processing program to protect us from embarrassment. But we also read student papers or text messages with spelling replacements that must have come from decisions made by the word-processing program—without a "sense check" by the writer. Is student learning harmed or helped by these technology supports? Just because students learned mathematics in the past with paper-and-pencil procedures does not mean that this is the best way to learn. In fact, the research on calculators has found that rather than eroding basic skills, calculator use has positive effects on students' problem-solving skills and attitudes toward math (Ellington, 2003, 2013; Waits & Demana, 2000). There is a catch, however: For simple math problems, it probably is better to attempt recalling or calculating the answer first before turning to a calculator. Math fact learning and fluency in arithmetic are supported when students self-generate answers before resorting to calculators (Mao et al., 2017; Pyke & LeFevre, 2011).

PSYCHOLOGICAL TOOLS. Vygotsky believed that all higher-order mental processes such as reasoning and problem solving are *mediated* by (accomplished through and with the help of) psychological tools. These tools allow children to transform their thinking by enabling them to gain greater and greater mastery of their own cognitive processes; they advance their own development as they use the tools. Vygotsky believed that the essence of cognitive development is mastering the use of psychological tools such as language to accomplish the kind of advanced thinking and problem solving that could not be accomplished without those tools (Gredler, 2012). The process goes something like this: As children engage in activities with adults or more capable peers, they exchange ideas and ways of thinking about or representing concepts—drawing maps, for example, as a way to represent spaces and places. Children internalize these co-created ideas. Children's knowledge, ideas, attitudes, and values develop through *appropriating* or "taking for themselves" the ways of acting and thinking provided by both their culture and other members of their group (Wertsch, 2007).

In this exchange of signs and symbols and explanations, children begin to develop a "cultural tool kit" to make sense of and learn about their world (Wertsch, 1991). The kit is filled with technical tools, such as graphing calculators or rulers, directed toward the external world and psychological tools for acting mentally, such as concepts, problem-solving strategies, and (as we saw earlier) argument strategems. Children do not just receive the tools, however. They transform the tools as they construct their own representations, symbols, patterns, and understandings. These understandings gradually change as the children continue to engage in social activities and try to make sense of their world (Siegler et al., 2020). In Vygotsky's theory, language is the most important symbol system in the tool kit and is the one that helps fill the kit with other tools.

The Roles of Language and Private Speech

Language is critical for cognitive development because it provides a way to express ideas and ask questions, the categories and concepts for thinking, and the links between the past and the future. Language frees us from the immediate situation so we can think about what was and what might be (Mercer, 2013). Vygotsky thought that:

> the specifically human capacity for language enables children to provide for auxiliary tools in the solution of difficult tasks, to overcome impulsive action, to plan a solution to a problem prior to its execution, and to master their own behavior. (Vygotsky, 1978, p. 28)

Vygotsky placed more emphasis than Piaget on the roles of learning and language in cognitive development. Vygotsky also believed that language in the form of private speech (talking to yourself) guides cognitive development.

PRIVATE SPEECH: VYGOTSKY'S AND PIAGET'S VIEWS COMPARED. If you have spent much time around young children, you know that they often talk to themselves as they play. This can happen when the child is alone or, even more often, in a group of children—each child talks enthusiastically, without any real interaction or conversation. Piaget called this the **collective monologue**, and he labeled all of the children's self-directed talk "egocentric speech." He assumed that this egocentric speech is another indication that young children can't see the world through the eyes of others, so they chat away without taking into account the needs or interests of their listeners. As they mature, and especially as they have disagreements with peers, Piaget believed children develop *socialized speech*. They learn to listen and exchange (or argue) ideas.

Collective monologue
Form of speech in which children in a group talk but do not really interact or communicate.

Vygotsky had very different ideas about young children's **private speech**. He suggested that rather than being a sign of cognitive immaturity, these mutterings play an important role in cognitive development because they move children in stages toward *self-regulation*: the ability to plan, monitor, and guide your own thinking and problem solving. First the child's behavior is regulated by others using language and other signs such as gestures. For example, the parent says, "No!" when the child reaches toward a candle flame. Next, the child learns to regulate the behavior of others using the same language tools. The child says, "No!" to another child who is trying to take away a toy, often even imitating the parent's voice tone. The child also begins to use private speech to regulate her own behavior, saying, "No" quietly to herself as she is tempted to touch the flame. Finally, the child learns to regulate her own behavior by using silent inner speech (Berk, 2019; Siegler et al., 2020).

Private speech
Children's self-talk, which guides their thinking and actions. Eventually, these verbalizations are internalized as silent inner speech.

For example, in any preschool room you might hear 4- or 5-year-olds saying, "No, it won't fit. Try it here. Turn. Turn. Maybe this one!" while they do puzzles. Around the age of 7, children's self-directed speech goes underground, changing from spoken to whispered speech and then to silent lip movements. Finally, the children just "think" the guiding words. The use of private speech peaks at around age 9 and then decreases, although one study found that some students from ages 11 to 17 still spontaneously muttered to themselves during problem solving (McCafferty, 2004; Winsler & Naglieri, 2003). Vygotsky called this inner speech "an internal plane of verbal thinking" 1987c, p. 279)—a critical accomplishment on the road to higher-order thinking.

This series of steps from spoken words to silent inner speech is another example of how higher mental functions first appear between people as they communicate and regulate each other's behavior and then emerge again within the individual as cognitive processes. Through this fundamental process, the child is using language to accomplish important cognitive activities such as directing attention, solving problems, planning, forming concepts, and gaining self-control. Research supports Vygotsky's ideas (Berk & Spuhl, 1995; Emerson & Miyake, 2003). Children and adults tend to use more private speech when they are confused, having difficulties, or making mistakes. Have you ever thought to yourself something like, "Let's see, the first step is" or "Where did I use my glasses last?" or "If I read to the end of this page, then I can…"? You were using inner speech to remind, cue, encourage, or guide yourself.

This internal verbal thinking is not stable until about age 12, so children in elementary school may need to continue talking through problems and explaining their reasoning in order to develop their abilities to control their thinking (Gredler, 2012). Because private speech helps students regulate their thinking, it makes sense to allow, and even encourage, students to use private speech in school. Teachers' insisting on total silence when young students are working on difficult problems may make the work even harder for the students. Take note when muttering increases in your class—this could be a sign that students need help.

Table 3.4 contrasts Piaget's and Vygotsky's theories of private speech. We should note that Piaget accepted many of Vygotsky's arguments and came to agree that language could be used in both egocentric and problem-solving ways (Piaget, 1962).

Table 3.4 Differences Between Piaget's and Vygotsky's Theories of Egocentric, or Private, Speech

	PIAGET	VYGOTSKY
Meaning and Purpose	Represents an inability to take the perspective of another and engage in reciprocal communication.	Represents externalized thought; its function is to communicate with the self for the purpose of self-guidance and self-direction.
Course of Development	Declines with age.	Increases at younger ages and then gradually loses its audible quality to become internal verbal thought.
Relationship to Social Speech	Negative; the least socially and cognitively mature children use more egocentric speech.	Positive; private speech develops out of social interaction with others.
Relationship to Environmental Contexts	No relationship.	Increases with task difficulty. Private speech serves a helpful self-guiding function in situations where more cognitive effort is needed to reach a solution.

Source: From "Development of Private Speech among Low-Income Appalachian Children," by L. E. Berk and R. A. Garvin, 1984, *Developmental Psychology*, 20, p. 272. Copyright © 1984 by the American Psychological Association. Adapted with permission.

The Zone of Proximal Development

According to Vygotsky, at any given point in development, a child is on the verge of solving certain problems—"processes that have not matured at the time but are in a period of maturation" (Vygotsky, 1998, p. 201). The child just needs some structure, demonstrations, clues, reminders, help with remembering details or steps, encouragement to keep trying, and so on. Some problems, of course, are beyond the child's capabilities, even if every step is explained clearly. The **zone of proximal development (ZPD)** is the area between what the child already knows and what the child isn't ready to understand or learn yet. The ZPD is the level of performance that the child could achieve with adult guidance or by working with "a more fully developed child" (p. 202). It is a dynamic and changing space as student and teacher interact and understandings are exchanged. This is the area where instruction can succeed. Kathleen Berger (2018, p. 52) called this area the "magic middle"—somewhere between "the boring and the impossible." As you probably can guess, this zone varies from time to time and student to student. In some situations, a student may only move a bit, no matter how much support is provided, but another student can soar and benefit from more and more support.

Zone of proximal development (ZPD)
Developmental phase at which a child can master a task if given appropriate help and support from a more capable person.

PRIVATE SPEECH AND THE ZONE. We can see how Vygotsky's beliefs about the role of private speech in cognitive development fit with the notion of the ZPD. Vygotsky once noted that thoughts have movement—they unfold. But what happens when the unfolding gets stuck? Often, an adult uses verbal prompts and structuring to help a child get unstuck—to solve a problem or accomplish a task (Hermkes et al., 2018). We will see later that this type of support has been called *scaffolding*. This support can be gradually reduced as the child takes over the guidance, perhaps first by giving the prompts as private speech and finally as inner speech. As an example, think of the young girl described earlier who had lost her toy. Let's move forward several years in her life and listen to her *thoughts* as an older student when she realizes that a schoolbook is missing. They might sound something like this:

> "Where's my math book? Used it in class. Thought I put it in my book bag after class. Dropped my bag on the bus. That dope Larry kicked my stuff, so maybe…."

The girl can now systematically search for ideas about the lost book without help from anyone else.

THE ROLE OF LEARNING AND DEVELOPMENT. Piaget defined *development* as the active construction of knowledge and *learning* as the passive formation of associations (Siegler, 2000). He was interested in knowledge construction and believed that cognitive development has to come before learning—the child has to be cognitively "ready" to learn. Children can memorize, for example, that Geneva is in Switzerland but still insist that they cannot be Genevan and Swiss at the same time. True understanding will take place only when the child has developed the operation of *class inclusion*—that one category can be included within another. But as we saw earlier, research has not supported Piaget's position on the need for cognitive development to precede learning (Brainerd, 2003).

In contrast, Vygotsky believed that learning is an active process that does not have to wait for readiness. He saw learning as a tool in development: Learning pulls development up to higher levels, and social interaction is a key in learning. In other words, what develops next is what is affected by learning (Bodrova & Leong, 2012; Gredler, 2012). This means that other people, including teachers, play significant roles in cognitive development. It does not mean that Vygotsky believed memorization is learning. When teachers try to directly communicate their understandings, the result can be a "meaningless acquisition of words" and "mere verbalization" (1987b, p. 356) that actually hides an understanding vacuum (Gredler, 2012). In Vygotsky's words, the teacher "explains, informs, inquires, corrects, and forces the child to explain" (p. 216). We can sum up (and maybe oversimplify) the contrast between Piaget and Vygotsky on learning by saying that Piaget favored discovery learning and Vygotsky advocated guided discovery.

Limitations of Vygotsky's Theory

Vygotsky's theory added important considerations by highlighting the roles of culture and social processes in cognitive development, but he may have gone too far. As you have seen in this cluster, we may be born with a greater store of cognitive tools than either Piaget or Vygotsky suggested. Some basic understandings, such as the idea that adding increases quantity, might be part of our biological predispositions, ready for use to guide our cognitive development. Young children appear to figure out much about the world before they have the chance to learn from either their culture or their teachers (Schunk, 2020; Woodward & Needham, 2009). The major limitation of Vygotsky's theory, however, is that it consists mostly of general ideas: Vygotsky died before he could expand and elaborate on his ideas and pursue his research. His students continued to investigate his ideas, but much of that work was suppressed by Stalin's regime until the 1950s and 1960s (Gredler, 2005, 2009b; Kozulin, 2003; Kozulin et al., 2003). A final limitation might be that Vygotsky did not have time to detail the applications of his theories for teaching even though he was very interested in instruction. As a result, most of the applications described today have been created by others—and we don't even know whether Vygotsky would agree with them. It is clear that some of his concepts, like ZPD, have been misrepresented at times (Gredler, 2012).

Implications of Piaget's and Vygotsky's Theories for Teachers

Piaget did not make specific educational recommendations, and Vygotsky did not have enough time to develop a complete set of applications. But we can glean some guidance from both men.

Piaget: What Can We Learn?

Even though Piaget's theory is not the overarching explanation of cognitive development anymore, his findings are still relevant in part "because he studied universal aspects of cognitive development, mainly children's understanding of physics—from object permanence, to conservation, to time and space" (Bjorklund, 2018, p. 2298). Piaget believed that the main goal of education should be to help children learn how to learn and that education should

"form not furnish" the minds of students (Piaget, 1969, p. 70). Piaget has taught us that we can learn a great deal about how children think by listening carefully and by paying close attention to their ways of solving problems. If we understand children's thinking, we will be better able to match teaching methods to children's current knowledge and abilities; in other words, we will be better able to differentiate instruction.

Even though Piaget did not design programs of education based on his ideas, his influence on current educational practice is huge. For example, the National Association for the Education of Young Children has guidelines for developmentally appropriate practice (DAP) that incorporate Piaget's findings (Bredekamp, 2017; Copple & Bredekamp, 2008; Gestwicki, 2017).

UNDERSTANDING AND BUILDING ON STUDENTS' THINKING. The students in any class will vary greatly in both their level of cognitive development and their academic knowledge. As a teacher, how can you determine whether students are having trouble because they lack the necessary thinking abilities or because they simply have not learned the basic facts? To do this, Case (1985) suggests you observe your students carefully as they try to solve the problems you have presented. What kind of logic do they use? Do they focus on only one aspect of the situation? Are they fooled by appearances? Do they suggest solutions systematically or by guessing and forgetting what they have already tried? Ask your students how they tried to solve the problem. Listen to their strategies. What kind of thinking is behind repeated mistakes or problems? Students are the best sources of information about their own thinking.

An important implication of Piaget's theory for teaching is what J. Hunt years ago (1961) called "the problem of the match." Students must be neither bored by work that is too simple nor left behind by teaching they cannot understand. According to Hunt, disequilibrium must be kept "just right" to encourage growth. Setting up situations that lead to unexpected results can help create an appropriate level of disequilibrium. When students experience some conflict between what they think should happen (a piece of wood should sink because it is big) and what actually happens (it floats!), they may rethink the situation, and new knowledge may develop. Many materials and lessons can be understood at several levels and can be "just right" for a range of cognitive abilities. Classics such as *Alice in Wonderland*, myths, and fairy tales can be enjoyed at both concrete and symbolic levels.

ACTIVITY AND CONSTRUCTING KNOWLEDGE. Piaget's fundamental insight was that individuals construct their own understanding; learning is a constructive process. At every level of cognitive development, you will also want to see that students are actively engaged in the learning process. In Piaget's words:

> Knowledge is not a copy of reality. To know an object, to know an event, is not simply to look at it and make a mental copy or image of it. To know an object is to act on it. To know is to modify, to transform the object, and to understand the process of this transformation, and as a consequence to understand the way the object is constructed. (Piaget, 1964, p. 8)

For example, research in teaching mathematics indicates that students from kindergarten to college remember basic facts better when they have learned these facts using manipulative materials such as counting sticks, pattern blocks, fraction strips, or blocks versus using abstract symbols only (Carbonneau et al., 2013). Beware, however, of assuming that you can just give students manipulatives to work with and they will learn automatically. In one study, middle school students learned more science when teachers accompanied manipulatives with in-depth guidance about how to use them. Research in other subject areas has found similar results (Hushman & Marley, 2015; Marley & Carbonneau, 2014). This active experience, even at the earliest school levels, should not be limited to the physical manipulation of objects but should also include mental manipulation of ideas that arise out of class projects or experiments (Gredler, 2005, 2012). For example, after a social studies lesson on different jobs, a primary-grade teacher might show students a picture of a woman and ask, "What could this person be?" After answers such

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Implications of Piaget's Theory (I, A2)

The music, physical education, and art teachers in a rural preK-to-8 school district work with students who characterize several of Piaget's stages. How should these three teachers adjust their teaching from level to level over the course of a week?

as "teacher," "doctor," "administrative assistant," "lawyer," "sales representative," and so on, the teacher could suggest, "How about a daughter?" Answers such as "sister," "mother," "aunt," and "granddaughter" may follow. This should help the children switch dimensions in their classifications and center on another aspect of the situation. Next, the teacher might suggest, "American," "jogger," or "poet." With older children, hierarchical classification might be involved: It is a picture of a woman, who is a human being; a human being is a primate, which is a mammal, which is an animal, which is a life form.

All students need to interact with teachers and peers in order to test their thinking, to be challenged, to receive feedback, and to watch how others work out problems. Disequilibrium is often set in motion quite naturally when the teacher or another student suggests a new way of thinking about something. As a general rule, students should act on, manipulate, observe, and then talk and/or write about (to the teacher and each other) what they have experienced. Concrete experiences provide the raw materials for thinking. Communicating with others makes students use, test, and sometimes change their thinking strategies.

Vygotsky: What Can We Learn?

Like Piaget, Vygotsky believed that the main goal of education was the development of higher mental functions, not simply filling students' memories with facts. So Vygotsky probably would oppose educational curricula that are an inch deep and a mile wide or seem like "trivial pursuit." As an example of this trivial pursuit curriculum, Margaret Gredler (2009a) described a set of materials for a 9-week science unit that had 61 glossary terms such as *aqueous solution*, *hydrogen bonding*, and *fractional crystallization*—many terms described with only one or two sentences.

Higher mental functions can be developed through cultural tools and passed from one individual to another in at least three ways: *imitative* learning (one person tries to imitate the other), *instructed* learning (learners internalize the instructions of the teacher and use these instructions to self-regulate), and *collaborative* learning (a group of peers strives to understand each other, and learning occurs in the process) (Tomasello et al., 1993). Vygotsky was most concerned with the second type, *instructed* learning through direct teaching or by structuring experiences that encourage another's learning, but his theory supports learning through *imitation* or *collaboration* as well. Thus, Vygotsky's ideas are relevant for educators who teach directly, intentionally use modeling to teach, or create collaborative learning environments (Miller, 2016; Wink & Putney, 2002). That group pretty much includes all of us.

THE ROLE OF ADULTS AND PEERS. Vygotsky believed the child is not alone in the world "discovering" the cognitive operations of conservation or classification. This discovery is assisted or mediated by family members, teachers, peers, and even software tools (Puntambekar & Hubscher, 2005). Most of this guidance is communicated through language, at least in Western cultures. In several other cultures, observing a skilled performance, not talking about it, guides the child's learning (Rogoff, 1990). Some people have called this adult assistance **scaffolding**, which is taken from Wood, Bruner, and Ross (1976). The idea is that children use the help for support while they build a firm understanding that will eventually allow them to solve the problems on their own. Actually, when Wood and his colleagues introduced the term *scaffolding*, they were talking about how teachers set up or structure learning environments, but Vygotsky's theory implies more dynamic exchanges that allow the teacher to support students in the parts of the task they cannot do alone—the interactions of assisted learning, as you will see next (Schunk, 2020).

ASSISTED LEARNING. Vygotsky's theory suggests that teachers need to do more than just arrange the environment so that students can discover on their own. Students cannot and should not be expected to reinvent or rediscover knowledge already available in their cultures. Rather, they should be guided and assisted in their learning.

Assisted learning, or guided participation, requires first learning from the students what is needed; giving information, prompts, reminders, and encouragement at the right times and in the right amounts; and gradually allowing the students to do more and more on

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Implications of Vygotsky's Theory (I, A2)

Make a list of scaffolding techniques that would be appropriate with different instructional levels and content areas. Think of scaffolding techniques that others used when you learned things outside of school (e.g., sports, hobbies).

Scaffolding

Support for learning and problem solving. The support could be clues, reminders, encouragement, breaking the problem down into steps, providing an example, or anything else that allows the student to grow in independence as a learner. Teachers and students make meaningful connections between what the teacher knows and what the students know and need in order to help the students learn more.

Assisted learning

Providing strategic help in the initial stages of learning, gradually diminishing that help as students gain independence.

Table 3.5 Strategies to Provide Scaffolding and Assisted Learning

- Model the thought process for the students: Think out loud as you solve the problem or outline an essay, for example.
- Provide organizers or starters such as *who, what, why, how*, and *what next*?
- Complete part of the problem.
- Give hints and cues.
- Encourage students to set short-term goals and take small steps.
- Connect new learning to students' interests or prior learning.
- Use graphic organizers: timelines, charts, tables, categories, checklists, and graphs.
- Simplify the task, clarify the purpose, and give clear directions.
- Teach key vocabulary words, and provide examples.

their own. Teachers can assist learning by adapting materials or problems to students' current levels; demonstrating skills or thought processes; walking students through the steps of a complicated problem; doing part of the problem (e.g., in algebra, the students set up the equation, and the teacher does the calculations, or vice versa); giving detailed feedback and allowing revisions; or asking questions that refocus students' attention (Rosenshine & Meister, 1992). Cognitive apprenticeships (Cluster 10) are examples. Look at Table 3.5 for more ideas about strategies that you can use in any lesson.

An Example Curriculum: Tools of the Mind

Deborah Leong and Elena Bodrova (2012) worked for years to develop a curriculum for preschool through second-grade children based on Vygotsky's theory. In Russia, Dr. Bodrova had studied with colleagues of Vygotsky and wanted to bring his ideas to teachers. The result is the *Tools of the Mind* project that includes curriculum ideas for preschool, kindergarten, and students with special needs (see toolsofthemind.org). One key idea taken from Vygotsky is that as children develop mental tools such as strategies for focusing their attention, they cease being prisoners of their environment—having their attention "grabbed away" by any new sight or sound. They learn to control their attention. A second key idea is that play, particularly dramatic pretend play, is the most important activity supporting the development of young children. Through dramatic play children learn to focus their attention, control their impulses, follow rules, use symbols, regulate their own behaviors, and cooperate with others. So a key element of the *Tools of the Mind* curriculum for young children is play plans, created by the children themselves. Children draw a picture of how they plan to play that day and then describe their plan to the teacher, who may make notes on the page and thus model literacy activities. Plans become more complex and detailed as children become better planners. Figure 3.5 on the next page shows a simple play plan for pretending to be a doctor.

Reaching Every Student: Teaching in the "Magic Middle"

Both Piaget and Vygotsky probably would agree that students should be taught in the magic middle (Berger, 2020), or the place of the "match" (Hunt, 1961)—where they are neither bored nor frustrated. Students should be put in situations where they have to reach to understand but where support from other students, learning materials, or the teacher is also available. Sometimes the best teacher is another student who has just figured out how to solve the problem because this student is probably operating in the learner's ZPD. Having a student work with someone who is just a bit better at the activity would be a good idea because both students benefit in the exchange of explanations, elaborations, and questions. In addition, students should be encouraged to use language to organize their thinking and to talk about what they are trying to accomplish, as in Figure 3.5. Dialogue and discussion are important avenues to learning (Schunk, 2020; Wink & Putney, 2002). The *Guidelines: Applying Vygotsky's Ideas in Teaching* on the next page give more ideas for applying Vygotsky's insights.

Figure 3.5 "I'm Going to Listen to Their Heart" Play Plan

Here a child draws a nurse and a client and then dictates to the teacher, "I'm going to listen to their heart." The teacher might encourage the child to add a stethoscope to the drawing so that the child can talk through the plan and then remember it better.



Source: Tools of the Mind. https://toolsofthemind.org/?s=play+plans. Used by permission.

GUIDELINES

Applying Vygotsky's Ideas in Teaching

Tailor scaffolding to the needs of students.

Examples

1. When students are beginning new tasks or topics, provide models, prompts, sentence starters, coaching, and feedback. As the students grow in competence, give less support and more opportunities for independent work.
2. Give students choices about the level of difficulty or degree of independence in projects; encourage them to challenge themselves but to seek help when they are really stuck.

Make sure students have access to powerful tools that support thinking.

Examples

1. Teach students to use learning and organizational strategies, research tools, language tools (wikis, dictionaries, or computer searches), spreadsheets, and word-processing programs.
2. Model the use of tools; show students how you use an appointment book or calendar app on your smartphone to make plans and manage time, for example.

Build on the students' cultural funds of knowledge (N. Gonzalez et al., 2005; Moll et al., 1992).

Examples

1. Identify family knowledge by having students interview each other's families about their work and home knowledge (agriculture, economics, manufacturing, household management, medicine and illness, religion, child care, cooking, etc.).
2. Tie assignments to these funds of knowledge, and use community experts to evaluate assignments.

Capitalize on dialogue and group learning.

Examples

1. Experiment with peer tutoring; teach students how to ask good questions and give helpful explanations.
2. Experiment with the cooperative learning strategies described in Cluster 10.
   For more information about Vygotsky and his theories, see tip.psychology.org/vygotsky.html.

Cognitive Development: Lessons for Teachers

In spite of cross-cultural differences in cognitive development and the different theories of development, there are some convergences. Piaget, Vygotsky, and more recent researchers studying cognitive development and the brain probably would agree with the following big ideas:

1. Cognitive development requires both physical and social stimulations.
2. To develop thinking, students have to be mentally, physically, and linguistically active. They need to experiment with, talk about, describe, reflect on, write about, and solve problems. But they also benefit from teaching, guidance, questions, explanations, demonstrations, and challenges to their thinking.
3. Teaching students what they already know is boring for them. Trying to teach what the student isn't ready to learn is frustrating and ineffective.
4. Challenge with support will keep students engaged but not fearful.

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Distinctions Between Piaget's and Vygotsky's Theories (I, A2)

Consider how two teachers—one based in Vygotskian theory and one based in Piagetian theory—might differ in their concepts of learning and teaching and the instructional techniques that they might prefer.

Module 10 Summary

Vygotsky's Sociocultural Perspective (pp. 116–122)

According to Vygotsky, what are three main influences on cognitive development? Vygotsky believed that human activities must be understood within their cultural settings. He believed that our specific mental structures and processes can be traced to our interactions with others; that the tools of the culture, especially the tool of language, are key factors in development; and that the ZPD is where learning and development are possible.

What are psychological tools, and why are they important? Psychological tools are signs and symbols such as numbers and mathematical systems, codes, and language that support learning and cognitive development. They change the thinking process by enabling and shaping thinking. Many of these tools are passed from adult to child through formal and informal interactions and teachings.

Explain how interpsychological development becomes intrapsychological development. Higher mental processes first appear between people as they are co-constructed during shared activities. As children engage in activities with adults or more capable peers, they exchange ideas and ways of thinking about or representing concepts. Children internalize these co-created ideas. Children's knowledge, ideas, attitudes, and values develop through appropriating, or "taking for themselves," the ways of acting and thinking provided by their culture and by the more capable members of their groups.

What are the differences between Piaget's and Vygotsky's perspectives on private speech and its role in development? Vygotsky's sociocultural view asserts that cognitive development hinges on social interaction and the development of language. As an example, Vygotsky describes the role of children's self-directed talk in guiding and monitoring thinking and problem solving, whereas Piaget suggests that private speech indicates the child's egocentrism. Vygotsky, more than Piaget, emphasized the significant role played by adults and more-able peers in children's learning. This adult assistance provides early support while students build the understanding necessary to solve problems on their own later.

What is a student's ZPD? At any given point in development, there are certain problems that a child is on the verge of being able to solve and others that are beyond the child's capabilities. The ZPD (zone of proximal development) is the place where the child cannot solve a problem alone but can succeed under adult guidance or in collaboration with a more advanced peer.

What are two criticisms or limitations of Vygotsky's theory? Vygotsky may have overemphasized the role of social interaction in cognitive development: Children figure out quite a bit on their own. Also, because he died so young, Vygotsky was not able to develop and elaborate on his ideas. His students and others since have taken up that work.

Implications of Piaget's and Vygotsky's Theories for Teachers (pp. 122–127)

What is the "problem of the match" described by Hunt? The "problem of the match" is that students must be neither bored by work that is too simple nor left behind by teaching they cannot understand. According to Hunt, disequilibrium must be carefully balanced to encourage growth. Situations that lead to unexpected results can help create an appropriate level of disequilibrium.

What is active learning? Why is Piaget's theory of cognitive development consistent with active learning? Piaget's fundamental insight was that individuals construct their own understanding: Learning is a constructive process. At every level of cognitive development, students must be able to incorporate information into their own schemes. To do this, they must act on the information in some way. This active experience, even at the earliest school levels, should include both physical manipulation of objects and mental manipulation of ideas. As a general rule, students should act, manipulate, observe, and then talk and/or write about what they have experienced. Concrete experiences provide the raw materials for thinking. Communicating with others makes students use, test, and sometimes change their thinking abilities.

What is assisted learning, and what role does scaffolding play? Assisted learning, or guided participation in the classroom, requires scaffolding—understanding the students' needs; giving information, prompts, reminders, and encouragement at the right time and in the right amounts; and then gradually allowing the students to do more and more on their own. Teachers can assist learning by adapting materials or problems to students' current levels, demonstrating skills or thought processes, walking students through the steps of a complicated problem, completing part of the problem, giving detailed feedback and allowing revisions, or asking questions that refocus students' attention.

Cluster 3 Review

Key Terms

Accommodation
Adaptation
Adolescent egocentrism
Assimilation
Assisted learning
Classification
Coactions
Co-constructed process
Cognitive development
Collective monologue
Compensation
Computerized axial tomography (CAT)
Concrete operations
Conservation
Cultural tools
Decentering
Development
Disequilibrium
Egocentric
Electroencephalograph (EEG)
Equilibration
Event-related potential (ERP)
Executive functioning
Formal operations
Functional magnetic resonance imaging (fMRI)
Glial cells
Goal-directed actions
Hypothetico-deductive reasoning
Identity
Lateralization
Maturation
Myelination
Near-infrared optical tomography (NIR-OT)
Neo-Piagetian theories
Neurogenesis
Neurons
Object permanence
Operations
Organization
Personal development
Physical development
Plasticity
Positron emission tomography (PET)
Preoperational
Private speech
Reversibility
Reversible thinking
Scaffolding
Schemes
Semiotic function
Sensitive periods
Sensorimotor
Seriation
Social development
Sociocultural theory
Synapses
Synaptic plasticity
Zone of proximal development (ZPD)

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Multiple-Choice Questions

1. Mr. Winstel was worried about his former star student, Ramon. As the seventh-grade year progressed, Ramon was frequently being called into the principal's office for skateboard stunts that broke school rules and bordered on dangerous. Recently, Ramon's parents contacted Mr. Winstel to alert him to the fact that Ramon had been skipping school to hang out with some older boys in the neighborhood. Which of the following statements would typically best describe what is happening with Ramon?
   - **A.** Ramon's culture demands that boys of his age begin to engage in behaviors that reflect fearlessness.
   - **B.** Ramon's limbic system is maturing, but his prefrontal lobe has not yet caught up.
   - **C.** Ramon is engaging in deviant behaviors as a cry for attention from his parents.
   - **D.** Ramon is undergoing a period of synaptic pruning, which causes adolescents to engage in risk-taking behavior.
2. Miss McClintock discovered that five of the students in her class are developmentally advanced. All of the students' language skills are exploding! Although many of the students still have trouble sharing, a few appear to understand that by sharing, everyone can be happy. Finally, there is one student who can solve conservation problems. According to Piagetian theory, in what stage are the students in Miss McClintock's class?
   - **A.** Formal operations
   - **B.** Concrete operations
   - **C.** Preoperational
   - **D.** Sensorimotor
3. In introducing students to persuasive advertising methods, which of the following approaches would be most apt to lead to student retention?
   - **A.** Determine what students already know about the topic, and connect new information to their prior knowledge.
   - **B.** Have students initially watch several commercials and take notes.
   - **C.** Lecture students on the major persuasive techniques, and have a quiz to assess learning.
   - **D.** Have students form groups to research persuasive techniques.
4. Research studies involving the brain and learning indicate that all but which one of the following statements are true?
   - **A.** There is no such thing as "left-brain" and "right-brain" thinking.
   - **B.** The production of new neurons continues into adulthood.
   - **C.** Using different modalities for instruction and activities that draw on different senses may support learning.
   - **D.** Pruning can damage heavily used cognitive pathways.

Constructed-Response Questions

Case

When planning for instruction, Mr. Gething remembers that students should be neither bored nor frustrated. Although this makes sense to him, he is unsure how he could compensate for the diverse group of students he has in his second-period language arts class. Some students have difficulty with the English language, and other students plan to participate in the school's annual Shakespearean play. He knows that by grouping students of mixed abilities, he could occasionally draw on the talents of his knowledgeable students to assist the less advanced students. He also understands that without guidelines, students might not accomplish anything.

5. Explain the theory of learning that Mr. Gething is initially drawing on, and identify the individual credited with it.
6. What is the term for the assistance that more knowledgeable class members might provide to less advanced students in order to help the latter succeed? List some strategies that the more knowledgeable students might use to assist their peers.

What Would They Do?

Teachers' Casebook: Symbols and Cymbals

Critical Thinking About Cases

At the beginning of this cluster, we asked you to think critically about how to help students understand abstract concepts (symbols and cymbals). Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Coralie Hafner • Primary/1st Grade Teacher
Olde Orchard Alternative Elementary, Columbus, OH

It is evident that these students are practical thinkers and have an understanding of basic, concrete facts. They recognize that a cymbal is a musical instrument due to personal connections (a sibling). They recognize connections that can be made between

objects (heart and love, torch to the Olympics, a ring to marriage) due to their relevance and use. It's unclear whether they understand that items and pictures can embody the meaning of the intangible (love, commitment, triumph, perseverance).

Begin with prior knowledge; the connection between things and ideas. I would show them pictures and we'd brainstorm concepts and ideas that they're reminded of when they look at the pictures. I'd include graphics, landmarks, and sentimental items as we discuss how they connect to a concept or construct that is larger than the item itself. We'd then begin to talk about expressions and idioms ("Break a leg") to build understanding that phrases have multiple meanings and interpretations.

In order to gauge their readiness for learning, I would listen to their interactions and dialogue, providing opportunities for them to share and bring in items that represent something personal to them. I would offer concrete examples of symbolism through the use of sign language, graphics, photographs, emoticons, punctuation, labels on bottles, brochures, and math manipulatives like base 10 blocks and Unifix cubes. These items would help them begin to understand the connection between an object and what it represents.

Research best practices on how to introduce the concept, build upon prior knowledge and how to navigate their thinking towards understanding. Once they build understanding, they will recognize the purpose for symbolism in poetry. Once students grasp symbolism, I would have them share their thinking and revelation with the other students for peer interaction and student-led discussions.

Amanda Romando • 6th Grade Teacher
Galileo School for Gifted Learning, Sanford, FL

The students' responses are telling me that they are misinterpreting a multiple-meaning word, and require some scaffolding to begin understanding the concept of symbolism. First, I would take this as a teachable moment to address multiple-meaning words and homophones. I would give some examples and explain that many words require context in order to fully understand their meanings. I would give some examples, and then elicit some examples from the students. Then, moving on to the lesson at hand regarding symbols, I would backtrack a bit in order to help the students understand the meaning of a symbol. Most kids in upper elementary, middle school, or high school grades are well versed in texting and computer skills. I would ask them what they use emojis for when they are texting. I would ask them what types of emojis they use and what they mean by them. This is a relatable way for students to start understanding that pictures and tangible objects can stand for (or symbolize) abstract ideas and thoughts in a simple, widely understood way.

After I am sure that my students understand the concept of a symbol, I would play a game of "Symbolism Pictionary" in order for them to explore the concept of symbolism. For example, I would say a word like "school," and the students would draw a quick picture of what comes to mind when they hear that word. Depending on my group of students, I might make it a game in order to encourage deeper thinking. Students could get bonus points for having unique answers, being able to clearly explain the reason they chose the symbol they did. From there, I would expand it to metaphorical and universal symbols, such as mountains to show overcoming adversity, or an owl to represent wisdom. As I proceeded with the unit, I would continue to refer back to these lessons on symbolism as we begin to analyze symbolic words and phrases in poetry.

If students continue to struggle with the concept of symbolism after these lessons, it might help me decide that they are not quite ready for this material, and I would focus on teaching figurative language within the poetry unit.

Linda Glisson and Sue Middleton • 5th Grade Team Teachers
St. James Episcopal Day School, Baton Rouge, LA

To begin the lesson, I would have the students use a dictionary to define the word *symbolism* (root word—*symbol*) to discover that it means "something that stands for or represents something else." I would then give them a brief "across the curriculum" exercise in ways they incorporate symbols and symbolism into their thinking every day. Examples follow. *Social studies, American history:* The American flag is just a piece of cloth. Why then do we recite a pledge to it? Stand at attention when it passes in a parade? What does it stand for? *English, literature—fables and fairy tales:* What does the wolf usually represent (stand for)? The lion? The lamb? *Art:* What color stands for a glorious summer day? Evil? Goodness and purity? I would continue with math symbols, scientific symbols, and music symbols and lead the students toward contributing other examples such as symbols representing holidays. I would then tell them about their own examples of symbolism that I had recorded. The students' participation in and enthusiasm for the exercises would serve to determine whether they were ready for the material.

Dr. Nancy Sheehan-Melzack • Art and Music Teacher
Snug Harbor Community School, Quincy, MA

Even very young children can recognize symbols if the symbol is presented first and the explanation required second. A drawing of an octagon on a pole has always elicited the answer, "A stop sign," whenever I have shown it. Children recognize symbols, but the teacher needs to work from their concrete knowledge to the more abstract concept, and there are a great many symbols in their daily life on which one can draw. Children as young as first-graders can recognize traffic sign shapes, letters of the alphabet, and numbers, and further can recognize that they stand for directions, sounds,

and how many. When they talk about these very common symbols, they can also realize they all use them for the same meaning.

Valerie A. Chilcoat • 5th and 6th Grade Advanced Academics Teacher
Glenmount School, Baltimore, MD

Concrete examples of symbolism must come from the students' own world. Street signs, especially those with pictures and not words, are a great example. These concrete symbols, however, are not exactly the same as symbolism used in poetry. The link has to be made from the concrete to the abstract. Silly poetry is one way to do this. It is motivating to the students to read or listen to, and it can provide many examples of one thing acting as another. This strategy can also be used in lower grades to simply expose children to poetry containing symbolism.

Karen Boyarsky • 5th Grade Teacher
Walter C. Black Elementary School, Hightstown, NJ

You can tell a lot about students' thinking simply by interpreting their reactions. Knowing how to interpret students' reactions is just as important as any other assessment tool you might use. In this case, it is clear that the students are confused about the concept of symbolism. This is a difficult concept even for many fifth-graders to understand and should be approached slowly. One approach to this topic would be to present students with pictures of familiar symbols, such as McDonald's Golden Arches, the Nike Swoosh, or the Target logo. Students could attempt to explain what each of these symbols mean. A discussion about why manufacturers choose to use symbols instead of words would follow. Another approach would be to have the students interpret comparisons that use *like* or *as.* For example, "Sue is as pretty as a flower." The teacher would guide the student to see that the author is using a flower to symbolize Sue's looks.

Cluster 4

The Self, Social, and Moral Development



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Teachers' Casebook:

Mean Girls

What Would You Do?

You have seen it before, but this year the situation in your middle school classroom seems especially vicious. A clique of popular girls has made life miserable for one of their former friends, Jasmine, who is now rejected. Jasmine committed the social sin of not fitting in—wearing the wrong clothes or hairstyles, not being pretty enough, or not showing an obvious interest in boys. To keep the status distinctions clear between themselves and Jasmine, the popular girls spread gossip about their former friend, often disclosing intimate secrets Jasmine revealed when she was still considered a close friend, which was only a few months ago. However, these girls are not passing notes or whispering in the hallways; they are using social media to humiliate Jasmine. First, they posted a long, heart-baring text from Jasmine to her former best friend, Maya. More recently, one of them used a cell phone to take a picture of Jasmine while she was changing her clothes after gym class and posted it on Instagram. Jasmine has been absent from school for three days since this latest incident.

Critical Thinking

- How would you respond to each of the girls?
- What—if anything—would you say to your other students?
- Are there ways you can address the issues raised by this situation in your classes?

Overview and Objectives

Schooling involves more than cognitive development. As you think back on your years in school, what stands out? Perhaps highlights of academic experiences but also memories of sports, relationships with teachers and friends, and a developing sense about yourself and the kind of person you would like to become. In this cluster, we examine these latter experiences, which comprise personal, social, and moral development.

We begin by looking at a basic aspect of development that affects all the others—physical changes as students mature. Then we explore Urie Bronfenbrenner's bioecological theory and use it as a framework for examining three major influences on children's personal and social development: families, peers, and teachers. Next, we explore ideas about how we come to understand ourselves by looking at self-concept and identity. Erik Erikson's psychosocial theory provides one lens for viewing these developments. Finally, we consider moral development: What factors determine our views about morality? What can teachers do to foster such personal qualities as honesty and cooperation? Why do some students cheat in their academic work? How can we support students to make "good" choices?

By the time you have completed this cluster, you should be able to:

4.1 Describe general trends, group differences, and challenges in physical development throughout childhood and adolescence.

4.2 Discuss how the components of Bronfenbrenner's bioecological model influence development, especially the influences of families, parenting styles, peers, teachers, and technology.

4.3 Describe general trends and group differences in the development of identity and self-concept.

4.4 Explain theories of moral development including those of Kohlberg, Gilligan, Nucci, and Haidt and discuss how teachers can deal with one moral challenge for students—cheating.

OUTLINE

Teachers' Casebook—Mean Girls: What Would You Do?
Overview and Objectives

MODULE 11: Physical Growth as a Context for Social and Moral Development
Physical Development
- Physical and Motor Development
- Play, Recess, and Physical Activity
- Reaching Every Student: Physical Activity and Students with Disabilities
- Challenges in Physical Development

MODULE 12: Bronfenbrenner's Theory
Bronfenbrenner: The Social Context for Development
- The Importance of Context and the Bioecological Model
- Families
- Peers
- Reaching Every Student: Teacher Support
- Teachers and Child Abuse

MODULE 13: The Self
Identity and Self-Concept
- Erikson: Stages of Psychosocial Development
- Self-Concept
- Sex Differences in the Self-Concept of Academic Competence
- Self-Esteem

MODULE 14: Social and Moral Development
Understanding Others and Moral Development
- Theory of Mind and Intention
- Moral Development
- Moral Judgments, Social Conventions, and Personal Choices
- Beyond Reasoning: Haidt's Social Intuitionist Model of Moral Psychology
- Moral Behavior and the Example of Cheating

Personal/Social Development: Lessons for Teachers

Cluster 4 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Mean Girls: What Would They Do?

MODULE 11 Physical Growth as a Context for Social and Moral Development

Learning Objective 4.1 Describe general trends, group differences, and challenges in physical development throughout childhood and adolescence.

Physical Development

This cluster is about personal and social development, but we begin with a kind of development that is a basic concern of all individuals and families—physical development.

Put Yourself in Their Place How tall are you? What grade were you in when you reached that height? Were you one of the tallest or shortest students in your middle or high school, or were you about average? Did you know students who were teased because of their physical appearance? How important was your physical development to your feelings about yourself?

Physical and Motor Development

For most children, at least in the early years, growing up means getting bigger and stronger and becoming more coordinated. It also can be a frightening, disappointing, exciting, and puzzling time.

YOUNG CHILDREN. Preschool children are very active. Their *gross-motor* (large muscle) skills improve greatly during these early years. Between ages 2 and about 4 or 5, preschoolers' muscles grow stronger, their brains develop to better integrate information about movements, their balance improves, and their center of gravity moves lower, so they are able to run, jump, climb, and hop. By age 2, most children stop "toddling." Their awkward, wide-legged gait becomes smooth and rhythmic; they have perfected walking. During their third year, most children learn to run, throw, and jump, but these activities are not well controlled until age 4 or 5. Most of these movements develop naturally if a child has typical physical abilities and opportunities to play. Children with physical impairments, however, may need special training to develop these skills. And because they can't always judge when to stop, many preschoolers need interludes of rest scheduled after periods of physical exertion (Berger, 2020; Thomas & Thomas, 2008).

Fine-motor skills such as tying shoes or fastening buttons, which require the coordination of small movements, also improve greatly during the preschool years. Children should be given the chance to work with large paintbrushes, fat pencils and crayons, big pieces of drawing paper, oversized Legos, and soft clay or play dough to accommodate their current skills. During this time, most children will begin to develop a lifelong preference for their right or left hand. By age 5, about 90% of students prefer their right hand for most skilled work. More boys than girls are left-handed, and a small, indeterminant proportion of people are ambidextrous—using different hands for different tasks or even switching hands during the same task (Feldman, 2004; Hill & Khanem, 2009). Handedness is a genetically based preference linked to brain development and organization, so don't try to change it. For example, some research indicates that left-handed children are more likely than their right-handed peers to develop advanced verbal and mathematical skills (Berk, 2019).

ELEMENTARY SCHOOL YEARS. During the elementary school years, physical development is fairly steady for most children. They become taller, leaner, and stronger, making them better able to master sports and games. There is tremendous variation among children, however. A particular child can be much larger or smaller than average and still be

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Human Development (I, A2)

Explain how development in one domain (e.g., physical, emotional) can affect development in other domains.

GUIDELINES

Dealing with Physical Differences in the Classroom

Address students' physical differences in ways that do not call unnecessary attention to the variations.

Examples

1. Try to seat smaller students so they can see and participate in class activities, but avoid seating arrangements that are obviously based on height.
2. Balance sports and games that rely on size and strength with games that reflect cognitive, artistic, social, or musical abilities, such as charades or drawing games.
3. Don't use and don't allow students to use nicknames based on physical traits.
4. Keep a good supply of tools and equipment (e.g., scissors, baseball gloves, field hockey sticks) for students who are left-handed.

Help students obtain factual information on differences in physical development.

Examples

1. Set up science projects on sex differences in growth rates.
2. Have readings available that focus on differences between early and late maturers. Make sure that you present the positives and the negatives of each.

(Continued)

3. Find out the school policy on sex education and on informal guidance for students. Some schools, for example, encourage teachers to talk to girls who are upset about their first menstrual period, whereas other schools expect teachers to send the girls to talk to the school nurse or counselor.
4. Give the students models in literature or in their community of accomplished and caring individuals who do not fit the culture's "ideal" physical stereotypes.

Accept that concerns about physical appearance will occupy much time and energy for adolescents.

Examples

1. Encourage teens to focus more on what they do than on how they look.
2. Deal with some of these issues through curriculum-related materials.

perfectly healthy. Children at this age notice physical differences and are not always the most tactful people (they are still learning norms for interacting politely and considerately). You may overhear comments such as "You're too little to be in third grade. What's wrong with you?" or "How come you're so fat?" These comments more often reflect curiosity than cruelty. However, witnessing such comments signals an opportunity for teaching and modeling kind and inclusive behavior toward people who are physically different. The *Guidelines for Dealing with Physical Differences in the Classroom* can help with this.

Puberty
The physiological changes during adolescence that lead to the ability to reproduce.

Menarche
The first menstrual period in girls.

Spermarche
The first sperm ejaculation for boys.

THE ADOLESCENT YEARS. **Puberty** marks the beginning of sexual maturity. It is not a single event, but a series of changes involving almost every part of the body. The sex differences in physical development observed during the later elementary years become even more pronounced at the beginning of puberty. But these changes take time. The earliest visible signs of puberty in girls are the growth of nipples and budding of breasts at around age 9. On average, girls have their first menstrual period (called **menarche**) between ages 12 and 13, but the actual range is from age 10 to 16½, with some sociodemographic groups reporting earlier menstruation than others (e.g., Black girls in the United States, Indian and Pakistani girls in the United Kingdom, and urban compared with rural girls in China). At about the same time, boys' testes and scrotums begin to grow larger. Boys have their first sperm ejaculation (called **spermarche**) between the ages of 12 and 14. Boys develop facial hair over the next several years, reaching their final beard potential by about age 18 or 19—although some boys take longer to develop their final facial hair. Less welcome changes in puberty are increases in skin oiliness, skin acne, and body odor. These trends reflect research conducted mainly in high-income countries (Brix et al., 2018; Kelly et al., 2017; Sun et al., 2012), but similar trends have also been observed in low- and mid-income countries, such as Nigeria (Irewole-Ojo et al., 2018)

Girls reach their final height around ages 14 to 16, several years ahead of boys, so there is a time in middle school, as in late elementary school, when many girls are taller than their male classmates. This size discrepancy can give girls an advantage in physical activities, but some girls feel awkward about it and, as a result, downplay their physical abilities (Woolfolk & Perry, 2015). Most boys continue growing until about age 19, but both boys and girls can continue to grow slightly until about age 25 (Thomas & Thomas, 2008; Wigfield et al., 2006).

EARLY AND LATER MATURING. Psychologists have been particularly interested in examining the academic, social, and emotional implications for adolescents who mature early and those who mature later.

For girls, maturing way ahead of classmates has been linked to some adverse outcomes in adolescence, especially when being larger and more "developed" than everyone else your age is not a valued cultural characteristic (Kelly et al., 2017; Mendle & Ferrero, 2012). For example, early maturation is associated with early sexual activity and teenage pregnancy, lower achievement in school, drug and alcohol abuse, emotional difficulties such as depression and anxiety during adolescence, and disordered eating. In mid- to later life, girls who mature early are at greater risk for heart disease and breast cancer.

However, the timing of maturation affects girls in different ways, depending on the social context. Researchers have found fewer problems for early maturing Black girls, but

studies of these girls are limited (DeRose et al., 2011; Stattin et al., 2011). Similarly, in a study of Native American (United States) and First Nations (Canada) girls, Melissa Walls and Les Whitbeck (2011) found that early maturating girls were more likely to abuse alcohol and drugs, but this association was influenced by social factors such as early dating and the attitudes of peers toward drugs. Maturing early can place girls in dating and friendship contexts where saying no to drugs is difficult. Later-maturing girls seem to have fewer problems, but they may worry that something is wrong with them, so adult reassurance and support are important for them too.

Findings from research on early maturity in boys are mixed. Some research suggests early maturity is associated with greater social competence and popularity, whereas other research links early puberty in boys to higher involvement in crime and risky behavior (Klopack et al., 2020). The early maturing boy's taller, broad-shouldered body type fits many cultural stereotypes for the male ideal, which might be an asset, but these boys also appear to be at greater risk for depression, victimization by bullies, eating disorders, early sexual activity, and abusing alcohol, illicit drugs, and cigarettes (Berk, 2019; Mendle & Ferrero, 2012; Westling et al., 2008). Here again, social context is important. Outcomes are contingent on such factors as peer group values, school experiences, parenting, and neighborhood organization/disorganization (Klopack et al., 2020).

Boys who mature late may have a more difficult time initially because they are smaller and less muscular than the "ideal" for men (Harter, 2006). However, some studies show that in adulthood, men who matured later tend to be more creative, tolerant, and perceptive. Perhaps the trials and anxieties of maturing late teach these boys to be better problem solvers (Brooks-Gunn, 1988; Steinberg, 2014). The *Guidelines: Dealing with Physical Differences in the Classroom* presented earlier offer some suggestions for all students.

The challenges of puberty may be amplified for gender nonconforming or nonbinary youth (Janika & Forcier, 2016). Many experience effects of chronic brain-body incongruence, lack of family and community support, discrimination, and marginalization, all of which can contribute to anxiety disorders, depression, low self-esteem, suicidal ideation, suicide attempts, and non-suicidal self-injury. However, recent research indicates a focus on early identification, family support, and well-timed interventions can mitigate these harms and offer long-term health benefits to these children and youth. Educators, along with medical and mental health professionals, need to be aware of sexual orientation and gender identity issues (SOGI) and be ready to offer support because these professionals might be a first point of contact for gender-diverse youth. The following resources can help:

1. The Community for Accredited Online Schools offers this teacher's guide to creating inclusive classrooms that attend to SOGI: https://www.accreditedschoolsonline.org/education-teaching-degree/lgbtq-youth
2. The Centers for Disease Control and Prevention offers resources for friends/supporters, teachers and school administrators, and parents, guardians and family members: https://www.cdc.gov/lgbthealth/youth-resources.htm
3. The OK2BME website offers downloadable resources (including lesson plans) for elementary and secondary school teachers: https://ok2bme.ca/resources/parents-educators/resources-for-schools-and-classrooms

In summary, puberty can make adolescents vulnerable. All adolescents can benefit from knowing that there is a very wide range of individual differences in maturation. As a teacher, you need to be aware that some youth may require specialized attention and support during these stressful times. In addition to the challenges we have discussed in this section, we address obesity and disordered eating later in the cluster.

Play, Recess, and Physical Activity

Play is spontaneous, self-initiated, and self-regulated activity (Edwards et al., 2020). When children view their activities as play, not work, they sustain their engagement for long periods of time without the need for external incentives. Play contributes to children's cognitive, social-emotional, and physical development. For example, at every age play provides stimulation that supports brain development. In fact, some neuroscientists suggest that play might help in the important process of pruning brain synapses during childhood

(Pellis, 2006). Play excites the senses and creates opportunities for children to improve eye-hand coordination as well as fine- and gross-motor coordination. Through play, children develop language, problem-solving, perspective-taking, and relationship skills (Hopkins et al., 2015; Lillard et al., 2013; Woolfolk & Perry, 2015).

Piaget (1966) identified three types of play associated with his stages of cognitive development. Babies and toddlers engage in sensorimotor play. They are interested in the properties and functions of objects (e.g., What can this do? What sounds can it make?) and learn by exploring, sucking, pounding, shaking, and throwing. Preschool children engage in symbolic, or pretend, play. They are able to use one object to represent another, and activities become more purposeful and meaningful (Howard, 2019). They may create simple games with predictable rules, and they *love* to make-believe. Elementary school children also like fantasy, but their fantasy and rule-based play becomes more complex, signaling the development of logical thinking skills. They also are beginning to play more sophisticated games and sports, which can support language development, as well as teach cooperation, fairness, negotiation, and winning and losing. As children head toward adolescence, games and sports continue to be part of their physical and social development (Woolfolk & Perry, 2015). Play spaces correspond to Vygotsky's ZPD, allowing children to experiment in a safe environment, try out new roles and behaviors, solve problems, and adapt to new situations (Chen & Fleer, 2016).

Given that play is so important for children's happiness and their social and cognitive development, teachers and schools might consider making learning more like play than work. Howard (2019) suggests this can be accomplished through more child-centered/child-led activities that are open-ended, focus on processes more than products, and offer lots of choices (Hopkins et al., 2015; Lillard et al., 2013).

CULTURAL DIFFERENCES IN PLAY. Play is a common experience for children all over the world. However, consistent with so many other topics, there are cultural differences in play. In some cultures, such as American or Turkish communities, adults, particularly mothers, often are play partners with their children. But in other cultures, such as East Indian, Indonesian, or Mayan, adults are not seen as appropriate play partners for children; siblings and peers are the ones who teach younger children how to participate in play activities (Callaghan et al., 2011; Vandermass-Peler, 2002). In some families and cultures, children spend more time helping with chores than playing.

However, there are characteristic forms of play across cultures. Variations of tag and games that involve jumping rope or playing with marbles and balls are played in countries all over the world. Different materials and "toys" are used as available for play—everything from expensive toys and digital devices to sticks, rocks, and banana leaves. Children use what their cultures and communities provide to play. Also, teachers in the United States and Australia may place less emphasis on the value of play for children's learning compared to teachers in other countries such as Norway, Sweden, New Zealand, and Japan, where a "play pedagogy" may be part of the curriculum (Lillemyr et al., 2011; Synodi, 2010).

EXERCISE AND RECESS. Physical activity and participation in athletics have benefits for all students' health, well-being, leadership skills, social relationships, brain development, and even learning. Because most of today's children do not get much physical activity in their daily lives, schools have a role in promoting active play. There are good, academic reasons for recess and exercise: Exercise promotes blood flow and increased neurotransmitters in the brain in addition to improving mood and helping students focus their attention (Berger, 2018). Well-designed recess and exercise periods can support social and emotional learning (SEL) by helping students to exercise capacities for managing emotions, showing respect and empathy for others, and maintaining positive relationships with peers (London, 2019a). Students in Asian countries, who consistently outperform U.S. students on international reading, science, and mathematics tests, have more frequent recess breaks throughout the school day. One study of 11,000 elementary students found that those who had daily recess of 15 minutes or longer every day were better behaved in class than students who had little or no recess. This was true even after controlling for student gender and ethnicity, public or private school setting, and class size (Barros et al., 2009).

Unfortunately, physical education (PE) time in the United States is being cut to allow for more academic time focused on test preparation (Ginsburg, 2007; Zhu et al., 2010). And some groups of students are more likely to miss out on exercise and recess than others (e.g., children in urban, low-income schools and students with disabilities). Rebecca London (2019a, 2019b) recommends schools guard against this "opportunity gap" by asking themselves three key questions: Is recess part of the daily schedule? Is recess withheld as a punishment for bad behavior or missed schoolwork? Has the school taken steps to make recess a safe, healthy, and inclusive experience?

Reaching Every Student: Physical Activity and Students with Disabilities

Compared to their peers, students with disabilities often have limited opportunities for sports participation. This should not be the case! Regular physical activity for children with disabilities is associated with numerous benefits, such as controlling or slowing the progression of diseases and disabilities, improving overall health and well-being, and ameliorating the psychosocial impact of having a disability (Woolfolk & Perry, 2015). Participating in sports and physical activity creates opportunities for children and youth with disabilities to form friendships and develop positive self-concepts and self-esteem (Murphy et al., 2008). Consider the achievements of individuals who compete in the Paralympics. All children should have the opportunity to develop their athletic potential.

"Inclusive playgrounds" are one way to ensure every child has access and is able to participate in activities on playgrounds. These places aim to go beyond the physical aspects of accessibility by creating spaces that promote social interaction and inclusion. Inclusive playgrounds, also known as "playgrounds for all," exist in many regions of the world, including the United States, Australia, Hong Kong, and the United Kingdom (Wenger et al., 2020).

One reason for concern about physical activity for children is the increase in childhood obesity, as you will see next.

Challenges in Physical Development

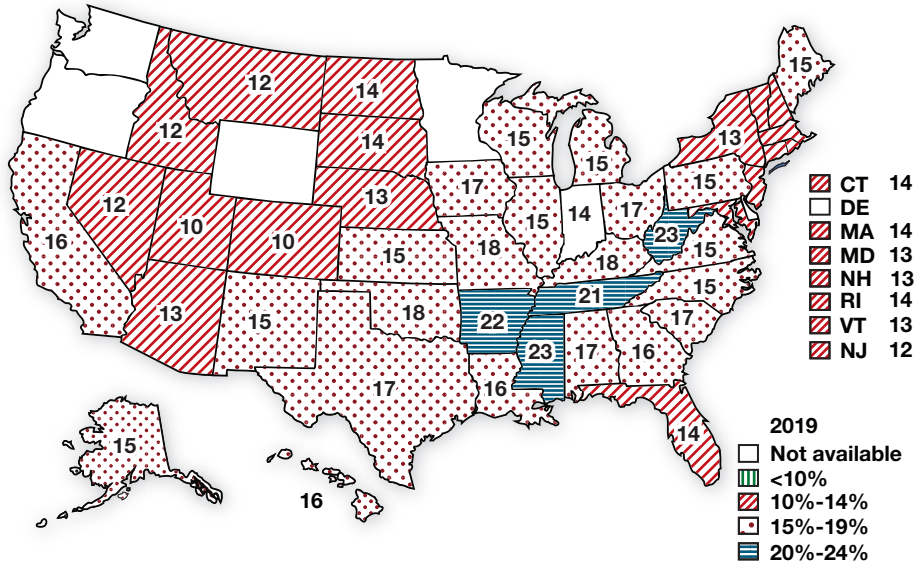
Physical development is public. Everyone sees how tall, short, heavy, thin, muscular, or coordinated you are. As students move into adolescence, they feel self-conscious, as though everyone is evaluating them, and physical development is part of what is being evaluated. So physical development also has psychological consequences (Thomas & Thomas, 2008).

OBESITY. Overweight and obesity among children and adolescents in developed countries have increased substantially in recent decades (Bray et al., 2019). In the United States, 18.5% of children and youth met criteria for obesity in 2015–2016 (Hales et al., 2017). See Figure 4.1 on the next page for the rates of obesity among high school students in U.S. states in 2019. Some groups of children and youth had higher rates of obesity than others (e.g., Black and Latino youth compared with White and Asian youth). Also, the rates of obesity for school-age children are higher than for preschool children, signaling an important role for early prevention and intervention.

The consequences of obesity are serious for children and adolescents: strain on bones and joints, respiratory problems, and a greater chance of heart problems, type 2 diabetes, and obesity as adults. Obesity also has negative effects on children's play with friends or participation in sports. Children with obesity often are the targets of cruel teasing and might be less agile or athletic, which means they are not chosen as often by students or teachers for teams in sports. Over the long term, these children can experience depression and reductions in self-esteem (Bray et al., 2019). Like everything else involving children's development, obesity has many interacting causes, including food insecurity, poor diet, genetic factors, increased hours sitting in front of screens (phones, computers, televisions, and tablets), and lack of exercise (Woolfolk & Perry, 2015).

Children's challenges with weight are on a continuum from minor concerns about overweight and body shape to disordered eating and other extreme efforts to control weight.

Figure 4.1 Percentage of High School Students in Selected States Who Had Obesity, 2019



Source: Centers for Disease Control and Prevention. Map retrieved from http://www.cdc.gov/healthyschools/obesity/obesity-youth.htm.

BODY IMAGE AND DISORDERED EATING. Body image refers to how people see themselves in their mind's eye—the image they perceive when they look in the mirror or at photographs. Body image reflects what people believe and feel about their bodies. As children grow and their bodies change, they may become concerned about their appearance. Exposure to print and online media, with its limited view of what makes people "attractive" and healthy, may lead to worries about how their bodies "measure up" to the cultural ideals. Excessive concern with body image is a risk factor in developing *disordered eating*, which is an unhealthy relationship with food. Disordered eating might include a rigid approach to eating only certain foods at certain times, forbidden foods, excessive exercise, and a preoccupation with body shape or size, among other concerns (Seitz, 2018). Disordered eating can lead to full-blown eating disorders such as **binge eating disorder** (uncontrolled eating of large quantities of food, often very quickly and to the point of discomfort), **bulimia nervosa** (binge eating followed by purging, fasting, or excessive exercise to "undo" the binge), and **anorexia nervosa** (restricting food intake for fear of weight gain).

Binge eating disorder
Uncontrolled eating of large quantities of food.

Bulimia nervosa
Binge eating followed by efforts to "undo" the binge (e.g., purging, fasting, use of laxatives, or excessive exercise).

Anorexia nervosa
Restricting food intake for fear of weight gain.

Disordered eating and eating disorders usually are linked to women and girls, but now there is ample evidence that a significant percentage of boys also experience body dissatisfaction and disordered eating. Mitchison and colleagues (2020) found that 12.8% of the adolescent boys in their Australian sample met established criteria for eating disorders, and in a U.S. nationally representative sample of adolescent boys, 30% reported trying to gain weight/bulk up even though 40% in this group were, objectively, in the normal weight range. Disordered eating in men is particularly prevalent in athletes but also in racial/ethnic and gender minority men (Gorrel & Murray, 2019; Nagata et al., 2020). Disordered eating is an issue that cuts across sociodemographic boundaries. It poses serious and wide-ranging health consequences, potentially impacting every organ in the body including the cardiovascular, electrolyte, and muscular-skeletal systems. Disordered eating affects self-esteem and is associated with anxiety, depression, smoking onset, alcohol and drug use, unsafe sexual behaviors, reduced physical activity, and both overweight and underweight (Bray et al., 2019; Nagata et al., 2020).

Students dealing with disordered eating usually require professional help. Don't ignore the warning signs! A teacher may be the person who begins the chain of help for these students. Also, teachers and other caregivers can proactively promote positive body

GUIDELINES

Supporting Positive Body Images in Adolescents

Listen to adolescents talk about their health.

Examples

1. If they mention wanting to lose weight, seize the opportunity to talk about healthy weight, body image, and cultural influences on youth.
2. It they mention diets they or their friends are trying, provide them with nutritionally sound information about myths, misinformation, and dangers related to fad diets.
3. In general, be attentive. An adolescent may make a brief comment that could serve as a terrific entrance into a valuable conversation about body image.

Be aware of the signs that a student might be dealing with disordered eating.

Examples

1. Students may lose 20% to 50% of their body weight; girls may stop having their menstrual periods.
2. The student's skin may be pale, the fingernails might be brittle, and fine, dark hairs may appear all over the body.
3. Students may complain about being cold or chilled when other students are fine.
4. Students might display signs of feeling depressed, insecure, or lonely.
5. Students may talk about pro-ana (pro-anorexia) or pro-ima (pro-bulimia) social networks or websites that describe these eating disorders as "choices" or "lifestyles." These sites often offer dangerous diets, tips for hiding weight loss, and social support for disordered eating.

Ask questions.

Examples

1. Are you concerned about your weight (or shape or size) at all? Do you think your friends are concerned about their weight? Do you or your friends talk a lot about your weight?
2. Do you know that diets are the worst way to lose or maintain weight? Have you ever dieted? Why?
3. Do you know that eating only low-fat or fat-free foods is NOT healthy eating? Do you know that you need fat in your diet and that without it, you can have all kinds of health problems?

Make resources about body image issues available for all students.

Examples

1. Have accurate, youth-oriented resources available to read, look up on the Internet, or find in a library.
2. Encourage youth to continue conversations about body image, weight, dieting, and other issues with you, their parents, a health professional, a trusted teacher, or a caring, knowledgeable adult before disordered eating becomes an eating disorder.
3. Deal with some of these issues in curriculum-related materials.

For more information about adolescents and body image, see https://www.nationaleatingdisorders.org and https://www.childrens.com/health-wellness/three-quick-tips-to-help-boost-your-childs-body-image.

Source: Based on Story, M., & Stang, J. (2005). Nutrition needs of adolescents. In J. S. M. Story (Ed.), *Guidelines for adolescent nutritional services* (pp. 158–159). Minneapolis, MN: University of Minnesota.

image and prevent disordered eating before it leads to the negative outcomes we listed earlier: Focus on healthy eating and enjoying physical activity to feel good and keep well. Promote a "body-confident culture" (Bray et al., 2019). See the *Guidelines: Supporting Positive Body Images in Adolescents* for more ideas and resources.

People certainly are more than physical bodies. The rest of this cluster discusses personal and moral development, beginning with a theoretical framework to put that development in context.

Module 11 Summary

Physical Development (pp. 131–141)

Describe the changes in physical development of children in the preschool, elementary, and secondary grades. During the preschool years, there is rapid development of children's gross- and fine-motor skills. Physical development continues throughout the elementary school years, with girls often ahead of boys in size. With adolescence comes puberty and emotional struggles to cope with all the related changes.

What are some of the consequences of early and late maturation for boys and girls? Girls mature about 2 years ahead of boys. Early maturing boys are more likely to enjoy high social status: They tend to be popular and to be leaders. But they also tend to engage in more delinquent behavior—this is true for White, Black, and Latino boys. Early maturation is not generally beneficial for girls. The challenges of puberty may be amplified for gender nonconforming or nonbinary youth.

What are the roles of recess and physical activity in development? Forms of play vary across cultures, but play supports brain development, language, and social development in them all. Children release tensions, learn to solve problems, adapt to new situations, cooperate, and negotiate when they engage in physical activity. Well-designed recess and exercise periods can support social emotional learning (SEL) by helping students to exercise capacities for managing emotions, showing respect and empathy for others, and maintaining positive relationships with peers. The increase in childhood obesity is linked to inactivity and increased time spent watching TV and Internet videos and playing passive games such as video games.

What is body image, and how does it relate to disordered eating? Body image refers to how people see themselves in their mind's eye. As children grow and their bodies change, they may become concerned about their appearance and how their bodies "measure up" to the cultural ideals. Excessive concern with body image is a risk factor in developing disordered eating, which can lead to eating disorders such as: binge eating disorder (uncontrolled eating of large quantities of food, often very quickly and to the point of discomfort), bulimia nervosa (binge eating followed by purging, fasting, or excessive exercise to "undo" the binge), and anorexia nervosa (restricting food intake for fear of weight gain).

MODULE 12 Bronfenbrenner's Theory

Learning Objective 4.2 Discuss how the components of Bronfenbrenner's bioecological model influence development, especially the influences of families, parenting styles, peers, teachers, and technology.

Bronfenbrenner: The Social Context for Development

We put the developing individual in context by exploring the work of Urie Bronfenbrenner (1917–2005), who was born in Moscow, Russia, but moved with his family to the United States when he was 6. Bronfenbrenner completed a double major in psychology and music at Cornell in 1938 and a PhD in psychology from the University of Michigan in 1942. Over his long career in psychology, he worked as a clinical psychologist in the U.S. Army and as a professor at the University of Michigan and at Cornell. He also helped found the Head Start early childhood program.

Context
Internal and external circumstances and situations that interact with the individual's thoughts, feelings, and actions to shape development and learning. The physical or emotional backdrop associated with an event.

The Importance of Context and the Bioecological Model

"Students typically do not learn alone but rather in collaboration with their teachers, in company with their peers, and with encouragement of their families" (Durlak et al., 2011, p. 405). Teachers, families, and peers are part of the students' context. **Context** is the total situation that surrounds and interacts with an individual's thoughts, feelings, and actions to shape development and learning. Contextual effects on the developing individual are

both internal and external. For example, hormone levels within the body are contexts for developing organs, including the brain, as well as for adolescents' self-concepts during puberty. The focus of this book, however, is the contexts outside the individual. Children grow up in families and are members of particular ethnic, language, religious, and economic communities. They live in neighborhoods, attend schools, and are members of classes, teams, glee clubs, or even gangs. Social and educational programs, along with the policies of governments, affect their lives. These contexts influence the development of behaviors, beliefs, and knowledge by providing resources, supports, incentives and punishments, expectations, teachers, models, tools—all the building blocks of learning and development (Chiu & Chow, 2015; Dodge, 2011; Lerner et al., 2005).

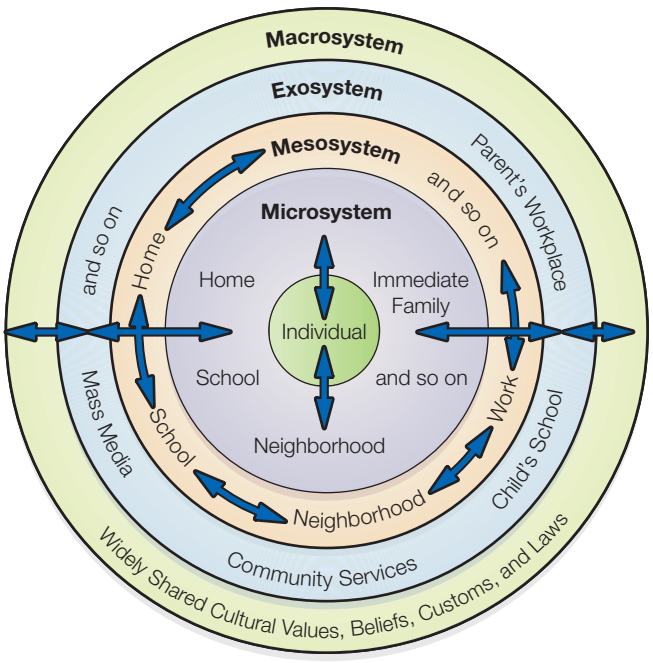
Contexts also affect how actions are interpreted. For example, if a stranger approaches a 7-month-old, the infant is likely to cry if the setting is unfamiliar but may not cry if the stranger is in the infant's home. Adults are more likely to help a stranger in need in small towns as opposed to in larger cities (Kagan & Herschkowitz, 2005). Think about hearing a telephone ring. Is it 3:00 in the afternoon or 3:00 in the morning? Did you just call someone and leave a message asking for a return call? Has the phone been ringing all afternoon, or is this the first call in days? Did you just sit down to dinner? The meaning of the ring and your emotional reactions will vary depending on the context.

Urie Bronfenbrenner's **bioecological model** of development (Bronfenbrenner, 1989; Bronfenbrenner & Morris, 2006) recognizes that the physical and social contexts in which we develop are *ecosystems* because they are constantly interacting with and influencing each other. Look at Figure 4.2. Every person lives within a microsystem, inside a mesosystem, embedded in an exosystem, all of which are a part of the macrosystem—like a set of Russian painted dolls, nested one inside the other. In addition, all development occurs in and is influenced by the time period—the chronosystem.

In the *microsystem* are the activities, roles, and relationships that the individual experiences in face-to-face settings. For children, the microsystem might be the immediate family, friends,

Bioecological model
Bronfenbrenner's theory describing the nested social and cultural contexts that shape development. Every person develops within a *microsystem* inside a *mesosystem* that is embedded in an *exosystem*—all of which are a part of the *macrosystem* of the culture. All development occurs in and is influenced by the time period—the *chronosystem.*

Figure 4.2 Urie Bronfenbrenner's Bioecological Model of Human Development
Every person develops within a *microsystem* (family, friends, school activities, teacher, etc.) inside a *mesosystem* (the interactions among all the microsystem elements) that is embedded in an *exosystem* (social settings that affect the child even though the child is not a direct member—community resources, parents' workplace, etc.); all are part of the *macrosystem* (the larger society with its laws, customs, values, etc.). All development occurs in and is influenced by the time period—the *chronosystem.*



or teachers; the activities of play and school; and their roles as family members and as students. Relationships in the microsystem are reciprocal; they flow in both directions. The student affects the teacher, and the teacher influences the student, for example. The *mesosystem* is the set of interactions and relationships among all the elements of the microsystem—the family members interacting with each other or with the teacher. Again, all relationships are reciprocal; the teacher influences the parents, and the parents affect the teacher, and these interactions affect the student. The *exosystem* includes all the social settings that affect the student, even though the student is not a direct member of these systems. Examples are the teachers' relations with administrators and the school board; the parents' jobs; the community resources for health, employment, or recreation; media; or the family's religious affiliation. The *macrosystem* is the larger society—its values, laws, policies, conventions, and traditions (Miller, 2016).

Families

Blended families
Parents, children, and stepchildren merged into families through remarriages.

Extended families
Different family members—grandparents, aunts, uncles, cousins, and so on—living in the same household or at least in daily contact with the children in the family.

Families today are varied. The most appropriate expectation to have about the structure of your students' families is no expectation at all. Increasingly, children today might be part of **blended families**, with stepbrothers or stepsisters who move in and out of their lives. Some children live with an aunt, with grandparents, with one parent, in foster or adoptive homes, or with an older brother or sister. In some ethnic and cultural groups, such as Asian, Latino, or Black, children are more likely to grow up in **extended families**, with grandparents, aunts, uncles, and cousins living in the same household or at least in daily contact with each other. In addition, some children might have two moms or two dads. Therefore, when speaking with students, avoid using the phrases "your parents" and "your mother and father" and speak instead about "your family."

No matter who is doing the parenting, research has identified characteristic differences in parents' styles.

Parenting styles
The ways of interacting with and disciplining children.

PARENTING STYLES. One well-known description of parenting, or caregiving, is based on the research of Diane Baumrind (1971, 1996, 2005; Baumrind et al., 2010). Her early work, in the late 1960s and early 1970s, focused on a careful longitudinal study of 100 (mostly European American, middle-class) preschool children from California. Through observations of the children and their parents, along with interviews of the parents, Baumrind and the researchers who built on her findings identified four **parenting styles** based on the parents' high or low levels of warmth and control, their expectations for maturity, and their willingness to grant autonomy.

- *Authoritative parents* (high warmth, high control, high expectations, support for autonomy) set clear limits, enforce rules, and encourage mature behavior. But they are warm with their children. They listen to concerns, give reasons for rules, forgive mistakes, and allow more democratic decision making. There is less strict punishment and more guidance. Parents help children think through the consequences of their actions.
- *Authoritarian parents* (low warmth, high control, high expectations, low autonomy) seem cold and controlling in their interactions with their children. The children are expected to be mature and to do what the parent says "Because I said so!" There is not much talk about emotions. Punishments are strict but not abusive. The parents love their children, but they are not openly affectionate.
- *Permissive parents* (high warmth, low control, low expectations, high autonomy) are warm and nurturing, but they have few rules or consequences for their children and expect little in the way of mature behavior because "They're just kids." These parents are sometimes called *indulgent* because they hide their frustration, listen to their children no matter how disrespectful they might be, and make sacrifices to buy the children whatever they want.
- *Rejecting/Neglecting/Uninvolved parents* (low warmth, low control, indifferent about expectations and autonomy) don't seem to care at all and can't be bothered with controlling, communicating, or teaching their children.

In broad strokes, different outcomes for children are associated with the four parenting styles (Baumrind, 1971; Berger, 2018; Parke & Buriel, 2006). At least in European American, middle-class families, children of *authoritative* parents are more likely to do well in school, be happy with themselves, and relate well to others. On average, children of *authoritarian* parents perform less well in school, are more hostile and less popular with peers, and have lower levels of self-control than children raised by authoritative parents. Children raised by permissive parents tend to be immature and demanding; more impulsive, rebellious, and aggressive than children raised by authoritative parents; and less socially competent and confident. Of course, the extreme of permissiveness becomes indulgence. Both indulgent and rejecting/neglecting parenting styles are harmful, but children of rejecting/neglecting parents fare worst of all: They tend to be insecure in their relationships, noncompliant, aggressive, and withdrawn. In adolescence, these children are more likely to engage in risky and delinquent behavior, experience disruptions in social and cognitive development, and perform poorly in school.

CULTURE AND PARENTING. Research on parenting styles is extensive, and findings are fairly robust across cultures and regions of the world (see Pinquart & Kauser, 2018 for a meta-analysis). However, because most of this research is correlational, we cannot claim that parenting styles *cause* the outcomes for children. Also, the differences among parenting styles, although statistically reliable, are generally small. Broad generalizations about styles don't capture nuances within styles or the influences of different beliefs and cultural contexts (Smetana, 2017). For example, in cultures that have a greater respect for elders and a more group-centered rather than individualist philosophy, it may be a misreading of the parents' actions to perceive their demand for obedience as "authoritarian" (Lamb & Lewis, 2005; Nucci, 2001). Research with Latino parents also suggests that Baumrind's parenting styles are not helpful in understanding these families, in part because respect for adult authority is not associated with cold parent–child relationships. Instead, adult authority and caring (*carino*) go hand in hand (Berger, 2018). Assuming parenting practices are consistent within cultures is also a mistake (e.g., Kim et al., 2013 identified four profiles to capture nuances in Chinese parenting). In addition, parenting that is strict and directive (i.e., authoritarian) but combined with high levels of warmth and emotional support is associated with higher academic achievement and greater emotional maturity for inner-city children (Garner & Spears, 2000; Jarrett, 1995). Differences in the perceived or actual danger level of some urban neighborhoods might make tighter parental control appropriate and even necessary (Smetana, 2000, 2017).

Whatever the structure of the families you work with, see the *Guidelines: Family and Community Partnerships* for ideas about how to connect with families.

Connect and Extend to PRAXIS II®

Families (I, B6)

Understand the influence of families, their cultures, and their values on student learning.

ATTACHMENT. The emotional bond that forms between people is called **attachment**. Children in every culture form first attachments with parents or caregivers even though people in different cultures may nurture attachments in different ways. For example, mothers in Uganda massage their infants but do not kiss them. What a difference from the custom in the United States, where a picture of a baby in a Facebook post highlighted the frequency of kissing infants in the United States: The baby was covered in lipstick, and the caption read, "Grandma is visiting" (Berger, 2018; Thompson & Raikes, 2003).

Attachment

Forming an emotional bond with another person, initially a parent or family member.

The quality of this attachment bond appears to have implications for forming relationships throughout life. Children who form what are called *secure attachments* with caregivers receive comfort when needed and are more confident in exploring their worlds, perhaps because they know they can count on the caregiver. Children who form *insecure-avoidant, resistant*, or *disorganized attachments* can be fearful, sad, anxious, clinging, rejecting, confused, or angry in interactions with the caregivers. Some research indicates that authoritarian parenting styles are related to forming insecure attachments, but as we saw earlier, many factors influence the effects of parenting styles (Roeser et al., 2006).

The quality of attachment has implications for teachers. For example, in preschools, children who have formed secure attachments with parents/caregivers make the adjustment to school more easily, are less dependent on teachers, and can interact with other children appropriately. Secure attachment is positively related to achievement test scores,

GUIDELINES

Family and Community Partnerships

Connecting with Families

1. Work with families to co-create methods for family involvement. Offer a range of possible participation methods. Make sure the plans are realistic and fit the lives of the families you are dealing with.
2. Remember that some students' families have had negative experiences with schools or may fear or mistrust schools and teachers. Find other places to collaborate: before or after ball games, or at local faith-based communities or recreation centers. Go where families go; don't always expect them to come to school.
3. Find out how your families like to communicate and maintain regular home–school communication through those channels: telephone calls or written notes; email, text messages, classroom websites or blogs. If literacy is a problem, use pictures instead of written communication, or find translators.
4. Make all communications positive, emphasizing growth, progress, and accomplishments.
5. With the families, design family–student celebrations of students' efforts and successes (movies, special meals, trips to the park or library, or treats such as ice cream and pizza). Ask families to share how they celebrate successes with you.
6. Follow up with families to discuss progress, answer questions, solicit their suggestions, and express appreciation for their contributions.
7. Make sure families feel welcome when they visit the classroom.

For more information on family school partnerships, see http://www.hfrp.org/family-involvement.

Source: From "Effects of Parent Involvement in Isolation or in Combination with Peer Tutoring on Student Self-Concept and Mathematics Achievement," by J. Fantuzzo, G. Davis, and M. Ginsburg, *Journal of Educational Psychology, 87,* pp. 272–281. Copyright © 1995 by the American Psychological Association. Adapted with permission of the APA.

teacher assessments of social competence throughout the school years, and even to lower dropout rates (Roeser et al., 2006). As we will see later, researchers are currently examining students' attachments to teachers and schools as a positive force in their lives.

DIVORCE. The divorce rate in the United States is one of the highest in the world, although it has been declining in recent years. According to census data, the divorce rate decreased from 22.6 divorces per 1000 marriages in 1980 to 14.9 in 2019 (Wang, 2020). But divorce rates differ depending on where you live in the country and other sociodemographic variables (e.g., SES).

As too many of us know from experiences in our own families, separation and divorce are stressful events for all participants, even under the best circumstances. The actual separation of the parents may have been preceded by years of conflict in the home or might come as a shock to all, including friends and children. During the divorce itself, conflict may increase as property and custody rights are negotiated. After the divorce, more changes may disrupt the child's life if the custodial parent moves to a new neighborhood or needs to work longer hours. For the child, this can mean leaving behind important friendships in the old neighborhood or school, just when support is needed the most. Even in those rare cases with few conflicts, ample resources, and the continuing support of friends and extended family, divorce is never easy for anyone. The first 2 to 4 years after a divorce tend to be the most difficult for children, with boys exhibiting more behavior and interpersonal problems than girls (Fuller-Thomson & Dalton, 2011). However, we want to emphasize that the long-term outcomes for the majority of children whose parents divorce are positive (Kelly, 2020). The overall effect of divorce depends on the balance of risk and protective factors (e.g., parental effectiveness versus conflict, resilient temperament versus a predisposition to psychological problems, adaptive coping strategies). Divorce can be a better alternative for children than growing up in a home filled with conflict and discord. "Destructive conflict in any type of family undermines the well-being of parents and children" (Hetherington, 2006, p. 232). See the *Guidelines: Helping Children of Divorce*.

GUIDELINES

Helping Children of Divorce

Take note of any sudden changes in behavior that might indicate problems at home.

Examples

1. Be alert to physical symptoms such as repeated headaches or stomach pains, rapid weight gain or loss, fatigue, or excess energy.
2. Be aware of signs of emotional distress such as moodiness, temper tantrums, or difficulty in paying attention or concentrating.
3. Let parents know about the students' signs of stress.

Talk individually to students about their attitude or behavior changes. This gives students a chance to share what's going on for them at home.

Examples

1. Be a good listener. Students may appreciate an[other] adult willing to hear their concerns.
2. Let students know you are available to talk, and let the students set the agenda.

Watch your language to make sure you avoid stereotypes about "happy" (two-parent) homes.

Examples

1. Simply say "your families" instead of "your mothers and fathers" when addressing the class.
2. Avoid using statements such as "We need volunteers for room mother" or "Your father can help you."

Help students maintain their self-esteem.

Examples

1. Recognize a job well done.
2. Make sure students understand each assignment and can handle the workload. This is not the time to pile on new and very difficult work.
3. The students may be angry at their parents but might direct this anger at teachers. Don't take the students' anger personally.

Find out what resources are available at your school.

Examples

1. Talk to the school counselor, social worker, or principal about students who seem to need outside help.
2. Consider establishing a discussion group, led by a trained adult, for students whose parents are going through a divorce.

Be sensitive to both parents' rights to information.

Examples

1. When parents have joint custody, both are entitled to receive information and attend parent–teacher conferences.
2. The noncustodial parent may still be concerned about the child's school progress. Check with your principal about state laws regarding the noncustodial parent's rights.

Be aware of long-term problems for students moving between two households.

Examples

1. Books, assignments, and gym clothes might be left at one parent's house when the student is currently on visitation with the other parent.
2. Parents may not show up for their turn to pick up their child at school or may miss a parent–teacher conference because a note didn't get shared.

For ideas about helping children adjust to divorce, see http://www.extension.missouri.edu/p/GH6611.

Peers

Children also develop within peer groups. Rubin and his colleagues distinguish between two kinds of peer groups: cliques and crowds (Rubin et al., 2005; 2015).

CLIQUES. *Cliques* are relatively small, friendship-based groups (typically with three to a dozen members); they are more evident in middle childhood and early adolescence. These cliques usually include peers of the same sex and age who share common interests and engage in similar activities. Cliques serve young people's emotional and security needs by providing a stable social context in which group members know each other well and form close friendships (Brown, 2004; Henrich et al., 2006).

Put Yourself in Their Place Think back to high school—did you have friends in any of these groups: populars, brains, jocks, partyers, emos, druggies, others? What were the main "crowds" at your school? How did your friends influence you?

CROWDS. *Crowds* are less intimate, more loosely organized groups based on shared interests, activities, attitudes, or reputations. Even though they might go by different names in different schools, some common crowds are *jocks, brains, Anime/Maga, druggies/stoners, emos/goths, populars, normals, loners, good-ats, floaters*, and *fine arts*—with *populars* and *jocks* at the top of the hierarchy and *loners* at the bottom in one study (Crabbe et al., 2019). Students don't necessarily *join* crowds; they are associated with or *assigned to* crowds by other students based on reputations and stereotypes (Cook & Cook, 2014). In fact, crowd members might not even interact with one another. Association with crowds occurs during early and middle adolescence (Rubin et al., 2005). W. Andrew Collins and Laurence Steinberg (2006, p. 1022) call crowds "an identity 'way station' or placeholder during the period between individuation from parents and establishment of a coherent personal identity."

Peer cultures
Groups of children or adolescents with their own rules and norms, particularly about such things as dress, appearance, music, language, social values, and behavior.

Crowds become far less prominent in late adolescence. Interestingly, adolescents who are relatively more confident in their identity tend not to value crowd affiliations as much as those who are still exploring identities, and by high school, many adolescents believe affiliations with particular crowds stifle their identity and self-expression (W. A. Collins & Steinberg, 2006).

PEER CULTURES. At any age, students who have a set of "rules"—how to dress, talk, style their hair, and interact with others—are called **peer cultures**. The group, crowd, or clique determines which activities, music, or other students are in or out of favor. For example, when Jessica, a popular high school student, was asked to explain the rules that her group lives by, she had no trouble:

> OK. No. 1: clothes. You cannot wear jeans any day but Friday, and you cannot wear a ponytail or sneakers more than once a week. Monday is fancy day—like black pants or maybe you bust out with a skirt. You have to remind people how cute you are in case they forgot over the weekend. No. 2: parties. Of course we sit down and discuss which ones we're going to because there is no point in getting all dressed up for a party that's going to be lame. (Talbot, 2002, p. 28)

These peer cultures encourage conformity to the group rules. When another girl in Jessica's group wore jeans on Monday, Jessica confronted her: "Why are you wearing jeans today? Did you forget it was Monday?" (Talbot, 2002, p. 28). Jessica explained that the group had to suspend this "rebel" several times, not allowing her to sit with them at lunch.

To understand the power of peers, we have to look at situations where the values and interests of parents clash with those of peers and then observe whose influence dominates. In these comparisons, peers usually win in matters of style and socializing. However, parents and teachers still are influential in matters of morality, career choice, and religion (Harris, 1998). Also, not all aspects of peer cultures are bad or cruel. The norms in some groups are positive and support achievement in school.

FRIENDSHIPS. Friendships are close, voluntary, and reciprocal relationships—they exist only when two parties view each other as a friend (Rubin et al., 2012, 2015). Friendships are central

to students' lives at every age. During early childhood they provide opportunities for children to play and regulate their behavior. In the middle years, friends provide support and a context for learning the social skills (e.g., compromise and conflict resolution) necessary for later intimate relationships. In adolescence, friendships are important for identity development. When there has been a falling-out or when rumors are started and pacts are made to ostracize someone (as happened to Jasmine at the beginning of the cluster or the "rebel" who wore jeans on Monday), the results can be devastating. In addition to causing the immediate trauma of being "in" or "out" with a friend or group, the end of a friendship can influence students' motivation and achievement in school (Chiu & Chow, 2015; Ryan, 2001) and result in depression, guilt, or anger (Rubin et al., 2012, 2015). In one study, sixth-grade students without friends showed lower levels of academic achievement, fewer positive social behaviors, and more emotional distress than students with at least one friend (Wentzel et al., 2004). The characteristics of friends and the quality of the friendships matter, too. Having stable, supportive relationships with friends who are socially competent and mature enhances social development and can protect and support students in difficult times, such as during parents' divorce or transition to new schools (W. A. Collins & Steinberg, 2006).

Unfortunately, the influence of friendships does not always facilitate adjustment and well-being (Rubin et al., 2012). For example, children who befriend similarly aggressive or withdrawn peers tend to experience increased adjustment problems over time, and peers can have profound influences on achievement-related behaviors in school (Masland & Lease, 2013; Steinberg, 1998).

POPULARITY. What does it mean to be popular? We could answer this question by observing students or by using ratings from parents or teachers. But the most common way to assess popularity is to use peers as informants to answer two questions: Is this child liked? and What is this child like? Based on the answers to these questions, we can identify four categories of peer acceptance (see Table 4.1).

Table 4.1 What Does It Take to Be Popular?

POPULAR CHILDREN
Popular prosocial children: These children are both academically and socially competent. They also may be athletes and school leaders. They do well in school and communicate easily with peers. When they disagree with other children, they respond appropriately and have effective strategies for working things out.
Popular antisocial children: This subgroup of children often includes boys who are aggressive. They may be athletic, and other children tend to think they are "cool" in the ways they bully other children and defy adult authority.
REJECTED CHILDREN
Rejected aggressive children: High rates of conflict and hyperactivity/impulsivity characterize the behaviors of this subgroup. These children have poor perspective-taking skills and self-control. They often misunderstand the intentions of others, assign blame, and act aggressively on their angry or hurt feelings.
Rejected withdrawn children: These children are timid and withdrawn, often the targets of bullies. They are often socially awkward and withdraw from social interactions to avoid being scorned or attacked.
CONTROVERSIAL CHILDREN
As the descriptor implies, *controversial children* have both positive and negative social qualities, and as a result, their social status can change over time. They can be hostile and disruptive in some situations and then engage in positive prosocial behaviors in others. These children have friends and are generally happy with their peer relationships.
NEGLECTED CHILDREN
Perhaps surprisingly, most *neglected children* are well adjusted and they are not less socially competent than other children. Peers tend to view them as shy, but they don't report being lonely or unhappy about their social lives. Apparently, they don't experience the extreme social anxiety and wariness that withdrawn children do.

Source: Woolfolk, A., & Perry, N. E. (2015). *Child and adolescent development* (2nd ed.). Reprinted by permission of Pearson Education.

WHO IS LIKELY TO HAVE PROBLEMS WITH PEERS? Children and adolescents are not always tolerant of differences. About 5% to 10% of children are victims of rejection, bullying, and other relational difficulties (Boivin et al., 2013). New students who are physically, intellectually, ethnically, racially, economically, or linguistically different may be rejected in classes with established cliques or crowds. Students who are aggressive, withdrawn, and inattentive-hyperactive are more likely to be rejected. But classroom context matters too, especially for aggressive or withdrawn students. In classrooms where the general level of aggression is high, being aggressive is less likely to lead to peer rejection. And in classrooms where solitary play and work are more common, being withdrawn is not as likely to lead to rejection. Thus, part of being rejected is just being too different from the norm—another example of the power of context to influence beliefs and behaviors. But being more attractive or engaging in prosocial behaviors such as sharing, cooperating, and friendly interactions are associated with peer acceptance, no matter what the classroom context. Many aggressive and withdrawn students lack these social skills; inattentive-hyperactive students often misread social cues or have trouble controlling impulses, so their social skills suffer, too (Coplan et al., 2004).

If students are repeatedly rejected or are victims of aggression, they might develop emotional problems such as depression or thoughts of suicide, behavioral or physical health problems, and difficulties in school (Boivin et al., 2013). Rejected children are less likely to participate in classroom learning activities, so their achievement can suffer; they are more likely to drop out of school as adolescents. Problems persist over time. In their review of 17 studies that followed children into adulthood, Patricia McDougall and Tracy Vaillancourt (2015) concluded, "There is evidence of a direct path between childhood peer victimization and poor long-term outcomes in adulthood" (p. 304). The strongest evidence was for heavy smoking for men and suicide for both men and women. In addition, rejected aggressive students are more likely to commit crimes as they grow older (Buhs et al., 2006). A teacher should be aware of how each student gets along with the group. Who is having problems with peers in your classroom? Careful adult intervention can often correct such problems, especially at the late elementary and middle school levels, as we will see next (Pearl et al., 2007).

Instrumental aggression
Strong actions aimed at claiming an object, place, or privilege—not intended to harm but might lead to harm.

Hostile aggression
Bold, direct action that is intended to hurt someone else; unprovoked attack.

Overt aggression
A form of hostile aggression that involves physical attack.

Relational aggression
A form of hostile aggression that involves verbal attacks and other actions meant to harm social relationships.

Cyber aggression
Using email, Twitter, Facebook, or other social media to spread rumors, make threats, or otherwise terrorize peers.

AGGRESSION. Aggression should not be confused with assertiveness, which means "affirming or maintaining a legitimate right." Saying, "You are sitting in my chair!" is assertive. Pushing the invader out of the chair is aggressive. There are several forms of aggression. The most common form is **instrumental aggression**, which is intended to gain an object or privilege, such as shoving to get a chair or snatching a phone from another student. The intent is to get what you want, not to hurt the other student, but the hurt might happen anyway. A second kind is **hostile aggression**—inflicting intentional harm. Hostile aggression can take the form of either **overt aggression**, such as threats or physical attacks (as in "I'm gonna beat you up!"), or **relational aggression**, which involves threatening or damaging social relationships (as in "I'm never going to speak to you again!"). Students who use both relational aggression and overt physical aggression are at the greatest risk for negative consequences such as rejection, depression, and school failure. But students who use aggression strategically and not too often might be among the popular crowd—respected as powerful and "cool" (Ettekal & Ladd, 2015).

Concern is growing today about a final kind of hostile aggression, **cyber aggression**—using email, Twitter, Instagram, Snapchat, or other social media to spread rumors, make threats, or otherwise terrorize peers, as Jasmine's friends did in the case at the beginning of this cluster.

Waiting for children to "outgrow" aggressive behaviors does not work. For example, one study in Finland asked teachers to rate students' aggression by answering, "never," "sometimes," or "often" to statements such as "hurts another child when angry." Teacher-rated aggression when students were age 8 predicted school adjustment problems in early adolescence and long-term unemployment in adulthood (Kokko & Pulkkinen, 2000). Similar results were found in a study conducted in Canada, New Zealand, and the United States. Boys (but not girls) who were often physically aggressive in elementary school were at risk for continuing violent and nonviolent forms of delinquency throughout adolescence (Broidy et al., 2003).

One of the best approaches for preventing problems with aggression later in life is to intervene early. For example, one study found that aggressive children whose teachers taught them conflict management strategies were diverted from a life path of aggression and violence (Aber et al., 2003). Many aggressive students misread both the emotions and the intentions of others—assuming the others "did it on purpose" when accidents happen or not perceiving when others are sad. Having empathy for someone else is difficult when you cannot accurately perceive the other person's emotions (Wells et al., 2020). One goal of social emotional and learning (SEL) described in a later section is to teach students to recognize the emotions and intentions of others as well as to understand their own feelings.

RELATIONAL AGGRESSION. Insults, gossip, exclusion, taunts—all are forms of relational aggression, sometimes called *social aggression* because the intent is to harm social connections. After second or third grade, girls, like Jasmine's friends in the opening case, tend to engage in relational aggression more than boys, possibly because as girls become aware of gender stereotypes, they push their overt aggression underground into verbal, not physical, attacks (Ettekal & Ladd, 2015). Relational aggression can be even more damaging than overt physical aggression—to both the victim and the aggressor. Victims, like Jasmine in the cluster opening, often are devastated. Teachers and other students may view relational aggressors as even more problematic than physical aggressors (Ostrov & Godleski, 2010). As early as preschool, children need to learn how to negotiate social relations without resorting to any kind of aggression. Interviews with adolescents reveal how much they count on their teachers and other adults in the school to protect them (Garbarino & deLara, 2002). We will examine more specific classroom strategies, especially strategies for handling bullying and cyberbullying, in Cluster 13.

MEDIA, MODELING, AND AGGRESSION. Modeling plays an important role in the expression of aggression (Bandura et al., 1963). One very real source of aggressive models is found in almost every home in America—television. Children ages 2 to 17 spend from 20 to 24 hours a week watching television—more time than on any other activity except sleep (Hinckley, 2014). With all this viewing, the possible influence of television violence is a real concern in the United States because children see about two gun-related incidents of violence for every hour of TV they watch (Common Sense Media, 2013a). Does watching violent content increase aggression? Probably (LoBue, 2018). In one study, 8- to 12-year-old children watched a film that either had characters with guns or had the guns edited out. After watching, the children went to a playroom where there were toys and also a real unloaded handgun in a drawer. The children who found the gun and had seen the film clip with guns played with the gun longer and were more likely to pull the trigger, some many times (Dillon & Bushman, 2017).

You can reduce the negative effects of media violence by stressing three points with your students: (a) most people do not behave in the aggressive ways shown on television or films; (b) the violent acts are not real but are created by special effects and stunts; and (c) there are better ways than violence to resolve conflicts, and most real people use those ways to solve their problems (Huesmann et al., 2003). But television is not the only source of violent models. Students growing up in some places see gang violence. Web posts, newspapers, and magazines are filled with stories of murders, rapes, and robberies. Many popular films are also filled with graphic depictions of violence, often performed by the "hero" who saves the day. And what about those video games?

VIDEO GAMES AND AGGRESSIVE BEHAVIOR. Researchers reviewed 130 reports based on more than 130,000 participants from Western countries, such as the United States, Australia, Germany, Italy, the Netherlands, Portugal, and the United Kingdom, as well as from Japan (Anderson et al., 2010). They found that playing violent video games is a causal factor for increased aggressive thoughts, feelings, and actions along with decreased feelings of empathy. Culture and gender had very little impact on how susceptible players were to the effects of these games. The effects were small, however, and clearer for younger children. Other researchers have questioned the connection between violent video games and actual violent

acts in the real world (Charles et al., 2013; Ferguson, 2015a, 2015b; Ferguson et al., 2015). They argue that measures of violent behaviors in laboratory situations involving college student participants are not predictors of actual violent actions committed by children and adolescents in the real world.

This issue is far from resolved. Even so, an important question facing teachers, parents, and our whole society is what we should do to limit the risks to children. See the *Guidelines: Dealing with Aggression and Encouraging Cooperation*.

Reaching Every Student: Teacher Support

For students facing emotional or interpersonal problems, teachers are sometimes the best sources of help because they spend so many hours with them each week. When students have chaotic and unpredictable home lives, they need a caring, predictable structure in

GUIDELINES

Dealing with Aggression and Encouraging Cooperation

Present yourself as a nonaggressive model.

Examples

1. Do not use threats of aggression to win obedience.
2. When problems arise, model nonviolent conflict resolution strategies (see Cluster 13).

Ensure that your classroom has enough space and appropriate materials for every student.

Examples

1. Prevent overcrowding.
2. Make sure prized toys or resources are plentiful.
3. Remove or confiscate materials, such as toy guns, that encourage personal aggression.
4. Avoid highly competitive activities and evaluations.

Make sure students do not profit from aggressive behaviors.

Examples

1. Comfort the victim of aggression, and ignore the aggressor.
2. Use reasonable punishment, especially with older students.

Teach directly about positive social behaviors.

Examples

1. Incorporate lessons on social ethics/morality into reading selections and discussions.
2. Discuss the effects of antisocial actions such as stealing, bullying, and spreading rumors.
3. Provide models and encouragement; role-play appropriate conflict resolution.
4. Develop self-esteem by building skills and knowledge.
5. Seek help for students who seem especially isolated and victimized.

Provide opportunities for learning tolerance and cooperation.

Examples

1. Emphasize the similarities among people rather than the differences.
2. Set up group projects that encourage cooperation.

Be knowledgeable about the video games your students are playing.

Examples

1. Play the games yourself or with a child to see what is actually happening.
2. Talk to students about the differences between what takes place in games and what happens in the real world.
3. Read reviews about the games in order to be informed about them.

For more ideas, see the National Youth Violence Prevention Resource Center: safeyouth.gov/Resources/Prevention/Pages/PreventionHome.aspx and Common Sense Media: https://www.commonsensemedia.org/violence-in-the-media#.

school. They need teachers who set clear limits, are consistent, enforce rules firmly but not punitively, respect students, and show genuine concern. Being liked and respected by teachers can offset the negative effects of peer rejection in middle school, and students who are neglected—simply ignored by other students—can remain well adjusted academically and socially when they are liked and supported by teachers (Bishop et al., 2014; McCormick & O'Connor, 2015).

As a teacher, you can be available to your students if they want to talk about their personal problems without requiring them to do so. One of my student teachers gave a boy in her class a journal titled "Very Hard Thoughts" so that he could write about his parents' divorce. Sometimes he talked to her about the journal entries, but at other times, he just recorded his feelings. The student teacher was very careful to respect the boy's privacy about his writings.

ACADEMIC AND PERSONAL CARING. When researchers ask students to describe a "good teacher," three qualities are consistently at the center of their descriptions: Good teachers have positive interpersonal relationships with students—they care about them. Second, good teachers keep the classroom organized and maintain authority without being rigid or "mean." Finally, good teachers are good motivators—they can make learning fun by being creative and innovative so that students learn something. Authoritative teaching strategies, like authoritative approaches to parenting, appear to lead to positive relationships with students and to enhance motivation for learning (Noguera, 2005; Woolfolk Hoy & Weinstein, 2006). We will look at motivation in Cluster 12 and at classroom management in Cluster 13, so for now let's focus on caring and teaching.

Students define caring in two ways. One is *academic caring*—setting high but reasonable expectations and helping students reach their goals. The second is *personal caring*—being patient, respectful, humorous, willing to listen, and interested in students' issues and personal problems. For students who are engaged and doing well in school, academic caring is especially important, but for students who are struggling academically and/or feeling alienated in school, personal caring is critical (Cothran & Ennis, 2000; Woolfolk Hoy & Weinstein, 2006). In fact, in one study in a Texas high school, the Mexican and Mexican American students saw teacher caring as a prerequisite for their own caring about school; in other words, they needed to be *cared for* before they could *care about* school (Valenzuela, 1999). Unfortunately, in the same school, the mostly non-Latino/a teachers expected students to care about school before they would invest their caring in students. And for many teachers, caring about school meant behaving in more "middle-class" ways.

Another study followed students from third through fifth grades and found that two factors helped students with lower skills in mathematics improve: higher-level (not just basic) skills instruction and positive relationships with teachers (Crosnoe et al., 2010). What is the lesson for teachers? Students need *both* appropriately challenging instruction *and* caring relationships. High expectations without caring can leave students feeling hopeless. Caring without high expectations can convince students that the teacher feels sorry for them because they are "not smart" or because they are "underprivileged." Neither stance is helpful (Katz, 1999). In short, caring means not giving up on students in addition to demonstrating and teaching kindness in the classroom (Davis, 2003; Milner, 2015).

SUPPORTING SOCIAL AND EMOTIONAL LEARNING. Teachers can create a sense of connectedness and caring in their classrooms by emphasizing social and emotional learning (SEL) as well as academic learning. SEL focuses on acquiring competencies to recognize and manage emotions, develop caring and concern for others, establish positive relationships, make responsible decisions, and handle challenging learning situations effectively (Schonert-Reichl & Hymel, 2007). In recent years, schools across North America and around the world have recognized the importance of these competencies as foundations for the development of positive health practices, engaged citizenship, and school success. Moreover, SEL has been linked to reductions in school dropouts and a wide range

Table 4.2 SEL Dimensions Promoted by the Collaborative for Academic, Social, and Emotional Learning

SEL DIMENSION	DESCRIPTION	STRATEGIES FOR ADDRESSING SOCIAL JUSTICE ISSUES
Self-awareness	Understanding one's emotions, values, strengths, and challenges; self-concept and self-confidence.	Help students develop self-awareness by reflecting on identity and equity (e.g., how does their identity hinder or enhance their opportunities in life?).
Social awareness	Having empathy for others; perspective taking; valuing diversity and interacting positively with others.	Have students study a current event or social issue that is important to them. Have them identify and engage in some form of advocacy to address that problem.
Self-management	Managing emotions and behaviors to achieve personal and social goals; perseverance and conscientiousness.	Engage students in an examination of how expectations for conduct and self-management are different for different groups of people (e.g., Black men).
Relationship skills	Forming and maintaining positive relationships; working collaboratively and productively with others; resolving conflicts; adaptive help-seeking.	Facilitate cooperative, constructive debates in which students need to communicate across their differences and resolve disagreements.
Responsible decision making	Assessing risks and making good decisions; respecting others; taking personal responsibility.	Ask students to identify a problem in their community and then work collaboratively to solve it while attending to safety, resources, social norms, and ethics.

Source: Based on CASEL (2018); Schonert-Reichl, K. A., & Hymel, S. (2007). Educating the heart as well as the mind: Social and emotional learning for school and life success. *Education Canada,* pp. 20–25; Simmons, D. (2019). Why we can't afford to whitewash social-emotional learning. *ASCD Education Update, 61*(4), 1–5.

of positive outcomes including increased engagement and achievement, enhanced self-esteem and sense of belonging, self-regulation, and expectations of future success and well-being (Messano et al., 2020).

Many schools in the United States are focusing on the five dimensions of SEL promoted by the Collaborative for Academic, Social, and Emotional Learning (CASEL; see http://www.casel.org). These dimensions are described in Table 4.2. SEL should be implemented in an integrated way—it should be practiced in all that goes on in the classroom, not just as stand-alone lessons several times each week. Frances Messano and her colleagues (2020) describe a school where teachers and students participated in daily advisory sessions. They discussed social and emotional challenges and developed skills for addressing them. Also they had beginning and end-of-day "check-ins" to assess how they were feeling and whether they had what they needed for learning. Another school used the Peer Helpers Program, which teaches students strategies for assisting peers with social, emotional, behavioral, and academic challenges. This is a powerful tool in situations where students do not feel comfortable asking an adult for help.

Dena Simmons (2019) highlights the ways SEL strategies can facilitate "courageous conversations" about diversity and social justice. Educators often feel ill-equipped and uncomfortable addressing topics such as poverty, racism, homophobia, transphobia, and other forms of injustice that their students, particularly their most marginalized students, experience every day. You saw such a situation in the "What Would You Do?" case in Cluster 2. Teachers can create and maintain a caring, safe space by infusing SEL into difficult conversations. The third column in Table 4.2 provides some examples of strategies to use. In summary, SEL holds great promise for encouraging positive teacher–student relationships and creates the conditions that foster youth agency and civic engagement, which are the drivers of social change (Simmons, 2019).

Teachers and Child Abuse

Certainly, one critical way to care about students is to protect their welfare and intervene in cases of abuse. Although accurate information about the number of abused children in the United States is difficult to find because many cases go unreported, in 2018 there were more than 673,000 confirmed cases of child abuse or neglect. That means a child is abused or neglected every 47 seconds. Evidence is found for child sexual abuse every 9 minutes (Children's Defense Fund, 2020b, 2020c; RAINN, 2021). Of course, parents are not the only people who abuse children. Siblings, other relatives, and even teachers, coaches, and community leaders—people the child knows and trusts—have been responsible for the physical and sexual abuse of children.

Even children who survive abuse pay a great price. In school alone, physically abused children are more likely to be aggressive in the classroom and to have difficulty understanding social situations and recognizing emotions in others. These children also are retained in grades and referred for special education services more often than children who are not abused (Luke & Banerjee, 2013; Roeser et al., 2006). But some survivors of abuse also have become advocates and activists to protect children from abuse. Erin Merryn, a sexual abuse survivor, is responsible for Erin's Law, now adopted in 37 states and pending in 12 others. The law requires all public schools to implement a sexual abuse education program focused on prevention (Erin's Law, 2021). The law has three main components:

1. Students from pre-K through grade 12 are taught age-appropriate ways of recognizing sexual abuse and telling a trusted adult about it.
2. All school personnel are taught about child sexual abuse.
3. Parents and guardians are taught the warning signs of abuse and given the needed resources or assistance to support sexually abused children and their families.

MANDATED REPORTING. As part of your responsibilities as a teacher, you *must* alert your principal, school psychologist, or school social worker when you suspect abuse. In all 50 states, the District of Columbia, and the U.S. territories, the law requires **mandated reporting**. Certain professionals, usually including teachers, must report suspected cases of child abuse (U.S. Department of Health and Human Services, 2020). The legal definition of *abuse* has been broadened in many states to include neglect and failure to provide proper care and supervision. Be sure that you understand the laws in your state or province about this important issue as well as your own moral responsibility. A child is killed by abuse or neglect every 5 hours in the United States, in many cases because no one would "get involved" (Children's Defense Fund, 2020c). You can make a difference.

Mandated reporting
By law, teachers and other professionals who have frequent contact with children must report suspected child abuse and neglect.

What should you look for as indicators of abuse? Table 4.3 on the next page lists possible indicators.

WHAT CAN TEACHERS DO? Besides finding out about your state's laws and reporting suspected abuse, what can you do? The Defend Innocence (2021) project gives these seven suggestions:

1. *Know the facts and the signs.* Sexual abuse affects students of all races, religions, ages, and income levels. Often the abuser is someone the child knows and trusts, not a stranger.
2. *Learn about what is the range of sexual development for your students.* If a child is behaving in ways that are unhealthy or age-inappropriate, that could be a sign of sexual abuse. Pay attention.
3. *Support students' emotional regulation.* Give them ways to identify and express their feelings. We will discuss emotional intelligence in the next cluster.
4. *Encourage and support policies in your school that address sexual harassment and abuse.* Discuss these policies with colleagues, and make sure you understand them.
5. *Support parents as they educate their children* about appropriate sexual behavior and healthy sexual development. Parents might begin with brief talks with their children or by stressing assertive communication skills.

6. *Trust your intuition—report problems.* This could even be talking with a colleague about problems you see developing between that person and a student. But if you suspect abuse, you must report it.
7. *Be an adult your students can trust and talk to.* Stress to students who seem troubled that secrets won't keep them safe.

Table 4.3 Indicators of Child Abuse

The following are some of the signs of abuse. Not every child with these signs is abused, but these indicators should be investigated. To learn about who must report child abuse, see childwelfare.gov/topics/systemwide/laws-policies/statutes/manda/.

TYPE OF ABUSE	PHYSICAL INDICATORS	BEHAVIORAL INDICATORS
Physical Abuse	• Unexplained bruises and welts (in various stages of healing), marks in the shape of belt buckles or electrical cords, human bite marks, puncture marks, or bald spots regularly appearing after absences or weekends • Unexplained burns, especially cigarette burns, burns in the shape of irons, rope burns, or immersion-burns (sock-like or glove-like) • Unexplained fractures, lacerations, or abrasions in various stages of healing • Injuries attributed to the child being "clumsy" or "accident prone"	• Awkward movements, complains of soreness • Self-destructive • Withdrawn and aggressive—behavioral extremes • Uncomfortable with physical contact • Arrives at school early or stays late, as if afraid • Chronic runaway (adolescents) • Wears high-neck, long-sleeved clothing, not matching the weather, to cover body • Frequent absences
Physical Neglect	• Abandonment • Unattended physical problems or medical needs • Constant fatigue, lack of energy • Little or no supervision • Often hungry, dressed inappropriately for the weather, poor hygiene • Distended stomach, emaciation	• Falls asleep in class • Steals food, begs from classmates • Reports that no caretaker is at home • Frequently absent or tardy, or stays as long as possible at school • Self-destructive • Trouble with the law
Sexual Abuse	• Difficulty walking or sitting • Pain or itching in genital area • Torn, stained, or bloodied underclothing • Bruises or bleeding in external genitalia • Venereal disease, especially in preteens • Frequent urinary or yeast infections • Pregnancy	• Doesn't want to change for gym, PE • Withdrawn, chronic depression • Role reversal, overly concerned for siblings • Promiscuity, excessive seductiveness • Peer problems, lack of involvement • Massive weight change • Suicide attempts (especially adolescents) • Inappropriate sex play or premature understanding of sex, frequent masturbation, sexual play with dolls or stuffed animals • Sudden school difficulties

Module 12 Summary

Bronfenbrenner: The Social Context for Development (pp. 142–156)

Describe Bronfenbrenner's bioecological model of development. Bronfenbrenner's model takes into account both the biological aspects internal to the individual and the nested social and cultural contexts that shape development. Every person develops within a microsystem (immediate relationships and activities) inside a mesosystem (relationships among microsystems) that is embedded in an exosystem (larger social settings such as communities); all of these are part of the macrosystem (culture). In addition, all development occurs in and is influenced by the time period—the chronosystem.

What are some aspects of the family that affect students in school? Students probably have experienced different parenting styles, and these styles can influence their social adjustment. At least in European American, middle-class families, children of authoritative parents are more likely to be happy with themselves and relate well to others, whereas children of authoritarian parents are more likely to feel guilty or depressed, and children of permissive parents may have trouble interacting with peers. Children of rejecting/neglecting parents tend to be insecure, noncompliant, aggressive, and withdrawn. But cultures also differ in parenting styles. Higher-control parenting is linked to better grades for Asian and Black students. Children in every culture form attachments even though their parents may nurture attachments in different ways. The quality of these attachment bonds has implications for forming relationships throughout life.

How does divorce affect children? During the divorce itself, conflict may increase as property and custody rights are being decided. After the divorce, the custodial parent may have to move to a less expensive home, go to work for the first time, or work longer hours. For the child, this can mean leaving behind important friendships just when support is needed the most, having only one parent who has less time than ever to be with them, or adjusting to new family structures when parents remarry.

Why are peer relationships important? Peer relationships play a significant role in healthy personal and social development. Strong evidence shows that adults who had close friends as children have higher self-esteem and are more capable of maintaining intimate relationships than are adults who had lonely childhoods. Adults who were rejected as children tend to have more problems, such as dropping out of school or committing crimes.

What are peer cultures? Groups of students develop their own norms for appearance and social behavior. Group loyalties can lead to rejection for some students, leaving them upset and unhappy.

What are the different types of aggression? Peer aggression can be instrumental (intended to gain an object or privilege) or hostile (intended to inflict harm). Hostile aggression can be either overt threats and physical attacks or relational aggression, which involves threatening or damaging social relationships. Boys are more likely to use overt aggression, and girls are more likely to use relational aggression. Today the many social media applications and sites provide other avenues for relational aggression.

How does ever-present media affect aggression and empathy? The world and the media provide many negative models of behavior. In time, children internalize the moral rules and principles of the authority figures who have guided them. If children are given reasons—particularly reasons that highlight the effects of their actions on others—they can understand why they are corrected and are more likely to internalize moral principles. Some schools have adopted programs to increase students' capacity to care for others.

How can teachers' academic and personal caring affect students? Students value caring teachers. Caring can be expressed as support for academic learning and concern for personal problems. For students who are higher achieving and have higher socioeconomic status, academic caring may be more important, but for students who are alienated from school, personal caring may be more important. Teachers can create a sense of connectedness and caring in their classrooms by emphasizing social and emotional learning (SEL) as well as academic learning.

What are some signs of child abuse? Signs of abuse or neglect include unexplained bruises, burns, bites, or other injuries; fatigue; depression; frequent absences; poor hygiene; inappropriate clothing; problems with peers; and many others. Teachers must report suspected cases of child abuse and can be instrumental in helping students cope with other risks as well.

MODULE 13 The Self

Learning Objective 4.3 Describe general trends and group differences in the development of identity and self-concept.

Identity and Self-Concept

In this section, we look at the development of identity and sense of self. You will see patterns similar to those noted in Cluster 3 for cognitive development. Children's understandings of themselves are concrete at first. Early views of self and friends are based on immediate behaviors and appearances. Children assume that others share their feelings and perceptions. Their thinking about themselves and others is simple, segmented, and rule-bound, not flexible or integrated into organized systems. In time, children can think abstractly about internal processes—beliefs, intentions, values, and motivations. With these developments in thinking, children can incorporate more abstract qualities into their knowledge of self, others, and morality (Harter, 2003, 2006; Woolfolk & Perry, 2015).

You will encounter the term *identity* as well as several "self" terms: *self-concept*, *self-esteem*, and *self-worth*. You will read even more about these concepts in Cluster 11. The distinctions among these terms are not always sharp; even psychologists disagree about what each term means (Roeser et al., 2006). We start by returning to *identity*, a concept you examined in Cluster 2 when you explored your own identity and that of your future students. In general, identity is a broader concept than the *self* terms. **Identity** is people's general sense of themselves including their beliefs, emotions, values, commitments, and attitudes along with their cultural, gender, sexuality, ethnic heritage, religion, class, age, and other intersections (Wigfield et al., 2006). Identity answers the question "Who are you?" Your identity rests on two notions: First, you are different from all other people—there is no other person who is identical to you out there, now or ever! Second, you are the same individual over time, even if you change your appearance, beliefs, knowledge, location, friends, career––you get the idea (Baumeister, 2005). Like the child in Cluster 3 who used the concept of identity to realize that when water is poured from a short glass into a tall skinny glass, it is the same amount of water, you know you are the same person, even when you go through many changes in your life. We begin our consideration of identity with the framework by Erik Erikson.

Identity
The complex answer to the question "Who am I?"

Erikson: Stages of Psychosocial Development

Like Piaget, Erik Erikson (1902–1994) did not start his career as a psychologist. He skipped college, traveled around Europe, and ended up teaching in Vienna, where he studied psychoanalysis with Anna Freud, the daughter of Sigmund Freud. Soon after completing his training, he had to flee from the Nazis. He was denied citizenship in Denmark, so he moved to his second choice—New York City. Even though he had never attended college, on the basis of his groundbreaking work, he became a distinguished University Professor at Harvard. Later in his career he worked with the original Dr. Spock—Benjamin Spock, the widely read pediatrician whose books guided many Baby Boomers' parents, mine included (Anita throughout this cluster) (Green & Piel, 2010; Miller, 2016).

Erikson offered a basic framework for understanding the needs of young people in relation to the society in which they grow, learn, and later make their contributions. Erikson's **psychosocial** theory emphasizes the emergence of the self, the search for identity, the individual's relationships with others, and the role of culture throughout life.

Psychosocial
Describing the relationship of the individual's emotional needs to the social environment.

Like Piaget, Erikson regarded development as a passage through an interdependent series of stages, each with particular goals, concerns, accomplishments, and dangers, as shown in Table 4.4 on the next page. At each stage, Erikson suggested that the individual faces a **developmental crisis**. Each crisis can be resolved by embracing an extreme position or by the healthier and more productive stance of finding a balance between the extreme responses. The way in which the individual resolves each crisis influences the resolution of future crises and has a lasting effect on that person's identity and view of society. We will look briefly at all eight stages in Erikson's theory—or, as he called them, the "eight ages of man."

Developmental crisis
A specific conflict whose resolution prepares the way for the next stage.

THE PRESCHOOL YEARS: TRUST, AUTONOMY, AND INITIATIVE. Erikson identified trust versus mistrust as the basic conflict of infancy. According to Erikson, infants will develop a sense of trust if their needs for food and care are met with comforting regularity and responsiveness from caregivers. In this first year, infants are in Piaget's sensorimotor stage and are just beginning to learn that they are separate from the world around them. Thus, infants must trust the aspects of their world that are separate and beyond their control (Miller, 2016; Posada et al., 2002). Having a secure attachment (described earlier in this cluster) helps young children develop trust and also learn when mistrust is appropriate—either extreme of complete trust or complete mistrust is dysfunctional.

Connect and Extend to PRAXIS II®

Erikson's Psychosocial Theory of Development (I, A1, 2)

The school population spans four stages of Erikson's theory. Identify the major crisis of each of these stages. How can teachers support positive resolution at each of these stages? What are the implications for negative resolution of these crises?

Erikson's second stage, **autonomy** *versus shame and doubt*, marks the beginning of self-control and self-confidence as young children begin to assume responsibilities for self-care such as feeding, toileting, and dressing. During this period, parents must tread a fine line in being protective—but not overprotective. If parents do not reinforce their children's efforts to master basic motor and cognitive skills, children may begin to feel shame; they may learn to doubt their abilities to manage the world. Of course, some doubt is appropriate when the task is too difficult or dangerous—again, the need for balance.

Autonomy
Independence.

For Erikson, the next stage of **initiative** *versus guilt* "adds to autonomy the quality of undertaking, planning, and attacking a task for the sake of being active and on the move" (Erikson, 1963, p. 255). The challenge of this period is to maintain a balance between zest for activity and an understanding that not every impulse can be acted on. Again, adults must tread a fine line, this time in providing supervision without interfering. If children are not allowed to do things on their own, a sense of guilt may develop; they may come to believe that what they want to do is always "wrong." The *Guidelines: Encouraging Initiative and Industry* on page 161 suggest ways of encouraging initiative.

Initiative
Willingness to begin new activities and explore new directions.

THE ELEMENTARY AND MIDDLE SCHOOL YEARS: INDUSTRY VERSUS INFERIORITY. Let's set the stage for the next phase. Between the ages of 5 and 7, when most children start school, cognitive development is proceeding rapidly. Children can process more information faster, and their memory spans are increasing. They are moving from preoperational to concrete-operational thinking. As these internal changes progress, children are spending hours every weekday in the new physical and social world of school. They must now reestablish Erikson's stages of psychosocial development in the unfamiliar school setting. They must learn to trust new adults, act autonomously in this more complex situation, and initiate actions in ways that fit the new rules of school—they are ready for the next stage.

The psychosocial challenge for the school years is what Erikson called **industry** *versus inferiority*. Children are beginning to see the relationship between perseverance and the pleasure of a job completed. In modern societies, children must cope with more demanding academics and complex social relationships, all the time being compared to others and

Industry
Eagerness to engage in productive work.

Table 4.4 Erikson's Eight Stages of Psychosocial Development

STAGES	APPROXIMATE AGE	IMPORTANT EVENT	DESCRIPTION
1. Basic trust versus basic mistrust	Birth to 12–18 months	Feeding	The infant must form a first loving, trusting relationship with the caregiver or develop a sense of mistrust.
2. Autonomy versus shame/doubt	18 months to 3 years	Toilet training	The child's energies are directed toward the development of physical skills, including walking, grasping, controlling the sphincter. The child learns control but may develop shame and doubt if not handled well.
3. Initiative versus guilt	3 to 6 years	Independence	The child continues to become more assertive and to take more initiative but may be too forceful, which can lead to guilt feelings.
4. Industry versus inferiority	6 to 12 years	School	The child must deal with demands to learn new skills or risk a sense of inferiority, failure, and incompetence.
5. Identity versus role confusion	Adolescence	Peer relationships	The teenager must achieve identity in occupation, gender roles, politics, and religion.
6. Intimacy versus isolation	Young adulthood	Love relationships	The young adult must develop intimate relationships or suffer feelings of isolation.
7. Generativity versus stagnation	Middle adulthood	Parenting/Mentoring	Each adult must find some way to satisfy and support the next generation.
8. Ego integrity versus despair	Late adulthood	Reflection on and acceptance of one's life	The culmination is a sense of acceptance of oneself and a sense of fulfillment.

Source: Lefton, Lester A., *Psychology* (5th ed.). © 1994. Reprinted by permission of Pearson Education, Inc. Upper Saddle River, NJ.

risking failure. Success in facing these new challenges will lead to a growing sense of competence. Difficulty can result in feelings of inferiority. Because schools tend to reflect middle-class values and norms, making the transition to school may be especially difficult for children who differ economically or culturally. The *Guidelines: Encouraging Initiative and Industry* give ideas that encourage industry.

After elementary school, in the transition to middle school, students confront an increased focus on grades and performance as well as more competition on all fronts—academic, social, and athletic. Just when they are eager to make decisions and assume more independence, students encounter more school rules, required courses, and assignments.

GUIDELINES

Encouraging Initiative and Industry

Encourage children to make and to act on choices.

Examples

1. Have a free-choice time when children can select an activity or a game.
2. As much as possible, avoid interrupting children who are very involved in what they are doing.
3. When children suggest an activity, try to follow their suggestions or incorporate their ideas into ongoing activities.
4. Offer positive choices: Instead of saying, "You can't have the cookies now," ask, "Would you like the cookies after lunch or after naptime?"

Make sure that each child has a chance to experience success.

Examples

1. When introducing a new game or skill, teach it in small steps.
2. Avoid competitive games when the range of abilities in the class is great.

Encourage make-believe with a wide variety of roles.

Examples

1. Have costumes and props that go along with stories the children enjoy. Encourage the children to act out the stories or make up new adventures for favorite characters.
2. Monitor the children's play to be sure no one monopolizes playing "teacher," "Mommy," "Daddy," or other heroes.

Be tolerant of accidents and mistakes, especially when children are attempting to do something on their own.

Examples

1. Use cups and pitchers that make it easy to pour and hard to spill.
2. Recognize the attempt even if the product is unsatisfactory.
3. If mistakes are made, show children how to clean up, repair, or redo.
4. If a child consistently behaves in ways that are highly unusual or unacceptable, seek guidance from the school counselor or psychologist. The best time to help children deal with psychosocial problems is at an early age.

Make sure that students have opportunities to set and work toward realistic goals.

Examples

1. Begin with short assignments, and then move on to longer ones. Monitor student progress by setting up progress checkpoints.
2. Teach students to set reasonable goals. Write down goals, and have students keep a journal of progress toward these goals.

Give students a chance to show their independence and responsibility.

Examples

1. Tolerate honest mistakes.
2. Delegate to students tasks such as watering class plants, collecting and distributing materials, monitoring the computer lab, grading homework, keeping records of forms returned, and so on.

Provide support to students who seem discouraged.

Examples

1. Use individual charts and contracts that show student progress.
2. Keep samples of earlier work so students can see how they have improved.
3. Have awards for most improved, most helpful, and most hard-working.

They change from having a close connection with one teacher all year to having more impersonal relationships with numerous teachers in many different subjects across the year. They also go from being the most mature and highest-status students in a small, familiar elementary school to being the "babies" in a large, impersonal middle school (Murdock et al., 2001; Rudolph et al., 2001). In this demanding context, they face the next challenge—*identity*.

ADOLESCENCE: THE SEARCH FOR IDENTITY. As students move into adolescence, they are developing capabilities for abstract thinking and understanding the perspectives of others. Even greater physical changes are taking place as the students approach puberty. So, with developing minds and bodies, young adolescents must confront the central issue of constructing an identity that will provide a firm basis for adulthood. The individual has been developing a sense of self since infancy. But adolescence marks the first time that a conscious effort is made to answer the now-pressing question "Who am I?" The conflict defining this stage is *identity versus role confusion. Identity* refers to organizing the individual's many facets and history into a consistent image of self and involves deliberate choices and decisions, particularly about work, values, and commitments to people and ideas (Miller, 2016). If adolescents fail to integrate all these aspects and choices or if they feel unable to choose at all, *role confusion* is possible.

Stop & Think Have you decided on your career? What alternatives did you consider? Who or what was influential in shaping your decision?

Exploration
In Marcia's theory of identity statuses, the process by which adolescents consider and try out alternative beliefs, values, and behaviors in an effort to determine which will give them the most satisfaction.

Commitment
In Marcia's theory of identity statuses, individuals' choices concerning political and religious beliefs, for example, usually as a consequence of exploring the options.

Identity achievement
Strong sense of commitment to life choices after free consideration of alternatives.

Moratorium
Identity crisis; suspension of choices because of struggle.

Identity foreclosure
Acceptance of parental life choices without considering options.

Identity diffusion
Uncenteredness; confusion about who one is and what one wants.

James Marcia (1967, 1994, 2007; Kroger & Marcia, 2013) expanded on Erikson's theory of identity formation by focusing on two essential processes: exploration and commitment. **Exploration** refers to the process by which adolescents consider and try out alternative beliefs, values, and behaviors. **Commitment** refers to individuals' choices concerning political and religious beliefs, for example, usually as a consequence of exploring the options. Then Marcia identified four categories or *identity statuses* that arise from four patterns of exploration and commitment.

The first, **identity achievement**, means that after *exploring* the realistic options, the individual has made choices and is *committed* to pursuing them. It appears that few students achieve this status by the end of high school; students who attend college might take even longer to decide. About 80% of students change their majors at least once (my mom was sure I had five different majors before I settled on psychology). And identity, once achieved, may not be unchanging for everyone (Arnett, 2015; Kroger et al., 2010; Kroger & Marcia, 2013).

Adolescents in the midst of struggling with choices are experiencing what Erikson called a **moratorium**. Erikson used the term *moratorium* to describe exploration with a delay in commitment to personal and occupational choices. This delay is very common, and probably healthy, for modern adolescents. Erikson believed that adolescents in complex societies have an identity crisis during moratorium. Today, the period is no longer referred to as a *crisis* because, for most people, the experience is a gradual exploration rather than a traumatic upheaval (Kroger & Marcia, 2013; Wigfield, Byrnes, & Eccles, 2006). Both identity-achieved and moratorium statuses are considered healthy.

Identity foreclosure is commitment without exploration. Foreclosed adolescents have not experimented with different identities or explored a range of options but simply have committed themselves to the goals, values, and lifestyles of others—usually their parents but sometimes cults or extremist groups. Foreclosed adolescents tend to be rigid, intolerant, dogmatic, and defensive.

Identity diffusion occurs when individuals do not explore any options or commit to any actions. They reach no conclusions about who they are or what they want to do with their lives. Adolescents experiencing identity diffusion may be apathetic and withdrawn,

with little hope for the future, or they may be openly rebellious. These adolescents often go along with the crowd, so they are more likely to abuse drugs (Archer & Waterman, 1990; Kroger, 2000).

IDENTITY AND TECHNOLOGY. All of the students you will teach are growing up in a world of media, mobility, and machines. A Pew study titled "Parenting Children in the Age of Screens" found that 71% of the parents surveyed were at least somewhat concerned that their children (age 12 and under) spent too much time on digital devices and 31% of that group were *very* concerned (Auxier et al., 2020). One research project found that 13-year-olds check their phones on average 100 times a day for social media updates (Walsh, 2015). When do they have time for anything else? And these social media posts demand immediate attention. As one high school sophomore complained, "Texting is pressure" (Turkle, 2011, p. 266). This pressure means that peers and even parents are always present—their messages demanding a response even if the student is in class and must text in secret under the desk or with hands inside a backpack. What will it be like to teach students who send and receive more than 100 text messages a day and who can't focus on your class when a friend's TikTok posting appears? These are questions you will have to answer when you step into a classroom.

Some scholars of technology have speculated that establishing a separate identity is complicated for adolescents today because they are constantly connected to others. Parents often give a cell phone to their children somewhere between the ages of 7 and 10 or even earlier, with the specific requirement that the children always answer a call from the parents. Sherry Turkle (2011) calls this happy recipient of a new cell phone a "tethered child." But the price paid for having a cell phone is that these tethered children never navigate social and physical landscapes completely alone—parents and friends are only a speed dial away. So the chance to solve problems and handle situations alone, the basis for achieving identity and mature judgment, is lost. A friend of mine is a physician at a university health center. She describes undergraduate patients who respond to her question "What are your health concerns today?" with the answer "My mom is on the phone—she'll tell you," and then the college student hands the cell phone to the doctor. Constant connectivity complicates achieving a separate identity and autonomy, not to mention doctor–patient confidentiality.

Connectivity also "offers new possibilities for experimenting with identity, particularly in adolescence, the sense of a free space, what Eric Erikson called the *moratorium*" (Turkle, 2011, p. 152). On Second Life, the Sims Online, Roblox, Minecraft, dating simulations, and other life-simulation and gaming sites, adolescents can create entirely new identities and keep multiple personalities "alive." Some people even talk about their "life mix," a mashup of what they live online and what they live in real life. For some adolescents, the boundaries may be unclear and easily crossed. Are the profiles that adolescents create on Instagram the "real" individuals or, as one high school senior described, the identity that you "mold" to present to the world? For connected and tethered adolescents today, Elkind's (1985) imaginary audience (discussed in Cluster 3) is now a real, online audience. The consequences are not all positive, as another senior agonized: "You have to know that everything you put up will be perused very carefully. And that makes it necessary for you to obsess over what you do put up and how you portray yourself . . ." (Turkle, 2011, p. 184).

Students should know that there probably are predators on all life-simulation sites, so beware. Schools that give adolescents guidance in the safe uses of social media, experiences with community service, real-world work, internships, and mentoring help foster identity formation. We talk much more about technology and learning in upcoming clusters. See the *Guidelines: Supporting Identity Formation*.

Intimacy
Forming close, enduring relationships with others.

BEYOND THE SCHOOL YEARS. The crises of Erikson's stages of adulthood all involve the quality of human relations. **Intimacy** *versus isolation* refers to a willingness to relate to another

Generativity
Sense of concern for future generations.

Integrity
Sense of self-acceptance and fulfillment.

person on a deep level, to have a relationship based on more than mutual need. Someone who has not achieved a sufficiently strong sense of identity tends to fear being overwhelmed or swallowed up by another person and may retreat into isolation. **Generativity** *versus stagnation* extends the ability to care for another person and involves concern and guidance for both the next generation and future generations. Productivity and creativity are essential features. Achieving **integrity** *versus despair* means consolidating your sense of self and fully accepting its unique and now unalterable history (Hearn et al., 2012).

Erikson's work helped start the lifespan-development approach, and his theories have been especially useful in understanding adolescence and developing concepts of self. But his work has been criticized because his descriptions are quite general and there really is no way to test his principles. He describes *what* changes without explaining *how* the changes occur (Miller, 2016). Feminists have criticized his notion that identity precedes intimacy because their research indicates that for women, identity achievement is fused with achieving intimacy (Horst, 2011). And Erikson overlooked racial and ethnic identity, discussed in Cluster 2.

GUIDELINES

Supporting Identity Formation

Give students many models for career choices and other adult roles.

Examples

1. Point out models from literature and history. Have a calendar with the birthdays of eminent women, minority leaders, and people who made little-known contributions to the subject you are teaching. Briefly discuss the person's accomplishments on his or her birthday.
2. Invite guest speakers to describe how and why they chose their professions. Make sure all kinds of work and workers are represented.

Help students find resources for working out personal problems.

Examples

1. Encourage them to talk to school counselors.
2. Discuss potential outside services.

Be tolerant of teenage fads as long as they don't offend others or interfere with learning.

Examples

1. Discuss the fads of earlier eras (neon hair, powdered wigs, love beads).
2. Don't impose strict dress or hair codes.

Give students realistic feedback about their work and support for improving. Adolescents may need many "second chances."

Examples

1. When students misbehave or perform poorly, make sure they understand the consequences of their behavior—the effects on themselves and others.
2. Give students model answers or show them other students' completed projects from previous years so they can compare their work to good examples.
3. Never use a student's work as a "bad" example. Create negative examples from multiple sources including mistakes you have made.
4. Because students are "trying on" roles, keep the roles separate from the person. Criticize the behavior without criticizing the student.

Caution students about the dangers of crafting identities online.

Examples

1. Discuss how colleges and employers check the social media profiles of applicants.
2. Explore possible ways of maintaining personal safety when online.

Some psychologists have used Marcia's identity statuses to understand the process of forming an ethnic identity. Children may begin with an unexamined ethnic identity, either because they have not explored it at all (diffusion) or because they have accepted the identity encouraged by others (foreclosure). Many European American adolescents could fit in the unexamined category. A period of ethnic identity exploration (moratorium) might be followed by a resolution of the conflict (identity achieved).

RACIAL AND ETHNIC PRIDE. No matter what your identity outcome is, having strong positive feelings about your own ethnic group seems to be important for good mental health as well as engagement and success in school (Cook & Cook, 2014; Steinberg, 2005). In fact, Amy Marks and her colleagues (2011) determined that bicultural adolescents who form strong positive multiethnic identities have higher self-esteem, fewer mental health problems, and higher academic achievement than peers with a single ethnic identity or an undeveloped multiethnic identity. For all students, **racial and ethnic pride** in family and community is part of the foundation of a stable identity. In one study, researchers found that African American preschool students whose homes were rich with African American traditions had more factual knowledge and better problem-solving skills than students whose homes lacked rich cultural resources. Parents who encouraged their children to be proud of their heritage reported fewer behavior problems with their children than parents who did not encourage racial pride (Caughy et al., 2002).

Racial and ethnic pride
A positive self-concept about one's racial or ethnic heritage.

In the next sections we move from overarching considerations of identity to more specific conceptions of self. In educational psychology, much research is focused on self-concept and self-esteem.

Self-concept
Individuals' knowledge and beliefs about themselves—their ideas, feelings, attitudes, and expectations.

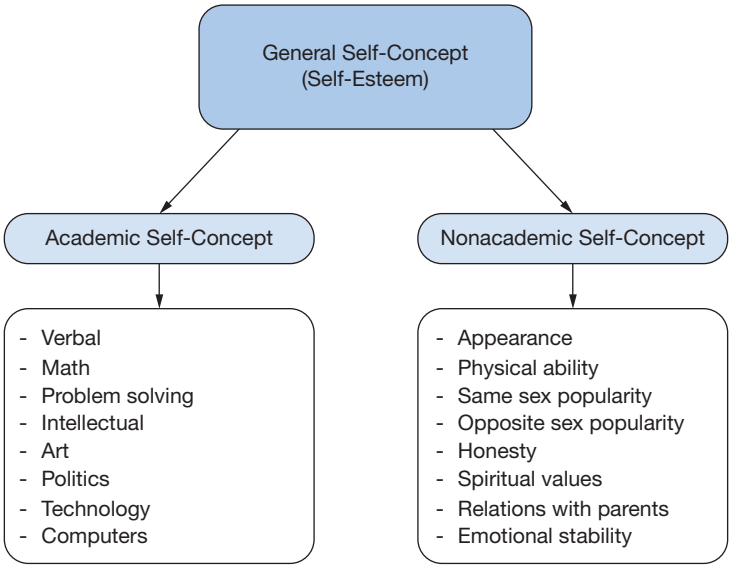
Self-Concept

The term *self-concept* is part of our everyday conversations. We talk about people who have a "low" self-concept or individuals whose self-concept is not "strong" as though self-concept were the oil level in a car or the fitness of abdominal muscles. These actually are misuses of the term. In psychology, **self-concept** generally refers to our mental picture of who we are. It is our attempt to explain ourselves to ourselves, to build a scheme (in Piaget's terms) that organizes our impressions, attitudes, and beliefs about ourselves (Harter, 2006; Pajares & Schunk, 2001). But this model or scheme is not permanent, unified, or unchanging. Our self-perceptions can vary from situation to situation and from one phase of our lives to another.

THE STRUCTURE OF SELF-CONCEPT. Self-concept is multidimensional, as shown in Figure 4.3. At the top of the hierarchy is general self-concept. This general self-concept is also called *global self-esteem* in the hierarchical model and can be defined as individuals' "self-perceptions of themselves as effective, capable individuals who have self-confidence and self-respect and are proud and satisfied with the way they are" (Marsh et al., 2006a, p. 455). At the next level are more specific self-perceptions, including *academic* and *nonacademic* self-concepts, and these self-concepts are made up of even more specific concepts such as self-concepts in math and languages or appearance and popularity. Herbert Marsh and his colleagues have identified up to 16 different self-concepts in *academic* and *nonacademic* areas, as you can see in Figure 4.3. These specific self-concepts are not highly correlated. For example, even though school *achievement* in verbal and math subjects is consistently correlated, verbal and math *self-concepts* are not correlated at all. In addition, self-concept in math predicts math achievement but not verbal achievement (Marsh et al., 2012, 2020).

For academic subjects, self-concepts include both perceptions of competence ("I am good in science") and affect or attitudes ("I like science") (Arens et al., 2011). For adolescents, both their overall *academic self-concept* (how quickly they learn or how well they do in school in general) and their *subject-specific self-concept* (how good they think they are in math, their attitudes toward math) may influence their decisions and motivation. For example, your educational aspirations and goals (e.g., deciding to attend college) are driven by your general academic self-concept. But the major you chose in college is influenced by your subject-specific academic self-concepts (Brunner et al., 2010).

Figure 4.3 A Hierarchical Model of Self-Concept



Source: Based on ideas from Marsh, H, W. (1990). The structure of academic self-concept: The Marsh/Shavelson Model. *Journal of Educational Psychology 82*, 623–636. Marsh, H. W., Xu, M., & Martin, A. J. (2012). Self-concept: A synergy of theory, method, and application. In K. R. Harris, S. Graham, & T. C. Urdan (Eds.) *APA educational psychology handbook, Vol. 1: Theories, constructs, and critical issues* (pp. 427-458). Washington, DC: American Psychological Association. Brunner, M., Keller, U., Dierendonck, C., Reichert, M., Ugen, S., Fischbach, A., & Martin, R. (2010). The structure of academic self-concepts revisited: The nested Marsh/Shavelson Model. *Journal of Educational Psychology, 102*, 964–981.

HOW SELF-CONCEPT DEVELOPS. Self-concept evolves through constant self-evaluation in different situations and using different frames of reference. Children and adolescents are continually asking themselves, in effect, "How am I doing?" To answer, they gauge the verbal and nonverbal reactions of significant people—parents and other family members in the early years and friends, schoolmates, and teachers later (Harter, 2012; Marsh et al., 2012). These self-evaluations contribute to a person's self-concept in any given domain and also to general self-concept/global self-esteem, which is discussed in a later section.

Younger children tend to have positive and optimistic self-concepts. They don't yet compare themselves to peers; they just compare their current skill levels to what they could do earlier in their lives and see improvement. In some ways this confidence protects them from disappointment and maintains persistence—a good thing for developing children (Harter, 2012).

For older students, both self and other comparisons and reference groups shape self-concepts, at least in Western cultures. Students' self-concepts in math are shaped by *internal comparisons*—how their math performance compares to their performance in history, for example. They also make *external comparisons* to other students' math performances. Generally speaking, students who are strong in math in an average class feel better about their math skills than do students of equal ability in a high-achieving class. Marsh and his colleagues call this the BFLPE, short for the "Big-Fish-Little-Pond-Effect" (Marsh et al., 2020; Salchegger, 2016). For example, Marsh and his colleagues (2014) studied more than 15,000 ninth-grade students from 651 classes in 95 Dutch schools. The researchers found strong evidence that students' academic self-concepts are largely determined by comparisons to other students in their own classrooms, not comparisons to students in other classes or other schools. Participation in a gifted and talented program seems to have a "Little-Fish-in-Big-Pond Effect": Students who participate in gifted programs, compared to similar students who remain in general education classes, tend to show declines in academic self-concepts over time but no changes in nonacademic self-concepts (Marsh & Craven, 2002; Preckel et al., 2010). Even though the BFLPE seems widespread, there is some indication that the effect is larger when students are tracked early, formally, and permanently into different types of schools and smaller when students are grouped into schools informally based on neighborhoods (Salchegger, 2016).

Before we move on to look at self-concept and achievement, an important caveat is in order: The development of self-concept does not follow the same path in every culture. Most Western and European parents want their children to develop a strong sense of self and a spirit of independence, but many Asian parents want their children to develop a strong sense of interdependence in relation to their family, community, and culture (Peterson et al., 2004). And not all subcultures within Western societies emphasize independence to the same extent. For example, many Latino children are taught that their personal identities are interdependent with and inseparable from the identity of their families (Parke & Buriel, 2006).

SELF-CONCEPT AND ACHIEVEMENT. Many psychologists consider self-concept to be the foundation of both social and emotional development. Research has linked self-concept to a wide range of accomplishments—from performance in competitive sports to job satisfaction to achievement in school (Goetz et al., 2010; Marsh & O'Mara, 2008; Möller & Pohlmann, 2010). Some evidence for the link between self-concept and school achievement shows that performance in academic subjects is correlated with specific self-concepts in those areas but not with social or physical self-concepts. For example, in one study, math self-concept correlated .77 with math test scores, .59 with grades, and .51 with coursework selection (Marsh et al., 2006b; O'Mara et al., 2006). That last correlation of math self-concept with course selection points to an important way self-concept affects learning in school. Think back to high school. When you had a chance to choose courses, did you pick your worst subjects—those where you felt least capable? Probably not. The courses selected in high school put students on a path toward the future, so self-concepts about particular academic subjects can be life-changing influences.

Unfortunately, heavy emphasis on grade-point averages (GPAs) for admission to some colleges can affect course choice as well, especially if students avoid classes to protect their GPAs because they see themselves as "no good" in math, science, world languages, or other challenging classes. They have a *fixed mindset* about their abilities—a powerful concept we will explore in Cluster 12. Of course, higher self-concept probably can encourage higher achievement, but high achievement likely also leads to higher self-concept, so the causes work in both directions (Marsh et al., 2012).

Sex Differences in the Self-Concept of Academic Competence

Do girls and boys differ in their self-concepts? A study followed 761 middle-class, primarily European American students from first grade through high school (Jacobs et al., 2002). Getting longitudinal data is difficult, so this is a valuable study. In first grade, girls and boys had comparable perceptions of their own abilities in language arts, but boys felt significantly more competent in math and sports. By high school, math competence beliefs were about the same for boys and girls. In sports, competence ratings for both boys and girls dropped, but boys remained significantly more confident in their competence in sports throughout the entire 12 years.

Other studies have also found that girls tend to see themselves as more able than boys in reading and close friendships; boys are more confident about their abilities in math and athletics. Of course, some of these differences in self-confidence may reflect actual differences in achievement; girls tend to be better readers than boys, for example. As we have seen, many self-beliefs are reciprocally related to achievement—each affects the other (Eccles et al., 1998; Marsh et al., 2012). For most racial and ethnic groups (except African American), boys are more confident than girls about their abilities in math and science. Unfortunately, there are no long-term studies of other ethnic groups, so these patterns might be limited to European Americans.

Because self-concept in a particular subject can affect course selection, teachers must be careful that their students do not avoid courses and subjects just because they don't feel confident. Later career paths can be closed if students avoid courses that are the gateways to those paths. Because self-concept and achievement probably affect each other, it makes sense to focus on both self-concept and performance enhancement.

Self-Esteem

Connect and Extend to PRAXIS II®

Self-Esteem (I, A2)

Understand the bidirectional effects of school life and self-esteem on each other. What can teachers do to enhance students' self-esteem?

Stop & Think How strongly do you agree or disagree with the following statements?

On the whole, I am satisfied with myself.
I feel that I have a number of good qualities.
I wish I could have more respect for myself.
At times, I think that I am no good at all.
I certainly feel useless at times.
I take a positive attitude toward myself.

These *Stop & Think* questions are taken from a widely used measure of self-esteem (Hagborg, 1993; Rosenberg, 1979).

Self-esteem

The value each of us places on our own characteristics, abilities, and behaviors.

Global self-esteem, at the top of the hierarchical model of self-concept, is an overall judgment of self-worth that includes feeling proud or ashamed of yourself as a person. Thus, **self-esteem** is the *evaluative* dimension of self-concept. If people judge themselves positively—if they "like what they see"—we say that they have high self-esteem (Schunk et al., 2014). Can you see the judgments of self-worth in the *Stop & Think* questions? The questions are pretty general; no specific areas such as academics or appearance are targeted. Self-esteem is influenced by whether the culture around you values your particular characteristics and capabilities (Bandura, 1997; Schunk et al., 2014). Nearly 130 years ago, William James (1890) suggested that self-esteem is determined by how successful we are in accomplishing tasks or reaching goals we value. If a skill or accomplishment is not important, incompetence in that area doesn't threaten self-esteem.

Do schools affect self-esteem? Is school important? As you can see from the *Point/Counterpoint*, the school's role in student self-esteem has been hotly debated.

POINT/COUNTERPOINT: What Should Schools Do to Encourage Students' Self-Esteem?

The attempts to improve students' self-esteem have taken three main forms: personal development activities such as sensitivity training; programs with a curriculum that focuses directly on improving self-esteem; and structural changes in schools that place greater emphasis on cooperation, student participation, community involvement, and ethnic pride. Are these efforts valuable?

Point

The self-esteem movement has big problems. Some people have accused schools of developing programs simply "to dole out a huge heaping of praise, regardless of actual accomplishments" (Slater, 2002, p. 45). Frank Pajares and Dale Schunk (2002) point to another problem: "[W]hen what is communicated to children from an early age is that nothing matters quite as much as how they feel or how confident they should be, one can rest assured that the world will sooner or later teach a lesson in humility that may not easily be learned" (p. 16). In addition, sensitivity training and self-esteem courses assume that we encourage self-esteem by changing the individual's beliefs, making the young person work harder against the odds. But what if the student's environment is truly unsafe, debilitating, and unsupportive? Some people have overcome tremendous problems, but to expect everyone to do so all the time can become "blaming the victim," saying your problems are your fault because you have low self-esteem (Beane, 1991).

Worse yet, some psychologists are now contending that low self-esteem is not a problem, whereas high self-esteem might be. For example, people with high self-esteem

(Continued)

are more willing to inflict pain and punishment on others (Baumeister et al., 2003; Slater, 2002). In addition, research consistently shows that improved self-esteem has no impact on achievement in school (Baumeister, 2005). For example, in a large study of adolescents, global self-esteem did not correlate with any of the nine academic outcomes measured (Marsh et al., 2006b). And when people set self-esteem as a main goal, they may pursue that goal in ways that are harmful over the long run. They may avoid constructive criticisms or challenging tasks (Crocker & Park, 2004). Psychologist Lauren Slater (2002), in her article "The Trouble with Self-Esteem," suggests that we rethink self-esteem and move toward honest self-appraisal that will lead to self-control. She suggests, "Maybe self-control should replace self-esteem as a primary peg to reach for" (p. 47).

Counterpoint

The self-esteem movement has promise. Beyond the "feel-good psychology" of some aspects of the self-esteem movement is a basic truth: Self-esteem is a fundamental right of all humans. When self-esteem increases, we generally feel happier, whereas a decrease in self-esteem makes us feel unhappy. Higher self-esteem is associated with increased initiative, better coping with stress and trauma, and the ability to maintain a more stable mood as well (Baumeister, 2005). We deserve to respect ourselves, and neither the society nor its schools should undermine that respect. The Girls Project (thegirlsproject.us) reminds young girls that their value and their self-esteem should be based on their character, skills, and attributes—not appearance. If we view self-esteem accurately as a product of our thinking and our actions—our values, ideas, and beliefs as well as our interactions with others—then we see a significant role for the school. Practices that allow authentic participation, cooperation, problem solving, and accomplishment should replace policies that damage self-esteem, such as tracking and competitive grading.

Erik Erikson (1980) explained years ago that a strong and positive sense of self comes only from "wholehearted and consistent recognition of real accomplishment, that is, achievement that has meaning in their culture" (p. 95).

Beware of Either/Or

Teachers' feedback, grading practices, evaluations, and communication of caring for students can make a difference in how students feel about their abilities in particular subjects. But the greatest increases in self-esteem come when students grow more competent in areas they value—including the social areas that become so important in adolescence. So a teacher's greatest challenge is to help students achieve important understandings and skills (Osborne & Jones, 2011). Another possibility is to change the focus from self-esteem to more specific self-concepts because self-concepts in specific areas such as math are related to learning in math (Marsh et al., 2015).

THE DANGERS OF PERFECTIONISM. What if your own self-esteem is tied to being "perfect" in everything you do? Sounds like a recipe for failure—no one can be perfect. But many teachers are concerned that some of their students believe they must be perfect. There are several ways to conceptualize perfectionism, but a common approach is to distinguish between *perfectionistic striving* and *perfectionistic concerns*. Perfectionistic striving is setting very high personal goals and being motivated to reach them. This aspect of perfectionism is related to positive learning outcomes—not too surprising because higher standards, striving for excellence, and motivation tend to be associated with learning. Perfectionistic concerns, on the other hand, include worrying about mistakes, fearing you haven't done enough or completed the task properly, doubting yourself, and seeing mistakes as failures. As you might guess, this kind of perfectionism is related to less learning and more anxiety and depression (Osenk et al., 2020). If you have students who seem perfectionistic, help them focus on striving for excellence, not fearing mistakes. When we discuss growth mindsets in Cluster 12, you will get some ideas for helping students set high standards but also embrace mistakes as a chance to grow their brains. The University

of San Diego provides some ideas for college students about finding a balance between healthy striving and debilitating perfectionism (https://sites.sandiego.edu/youareusd/healthy-striving-vs-perfectionism).

Module 13 Summary

Identity and Self-Concept (pp. 158–170)

What are Erikson's stages of psychosocial development? Erikson's emphasis on the relationship between society and the individual is a psychosocial theory of development—a theory that connects personal development (*psycho*) to the social environment (*social*). Erikson believed that people go through eight life stages, each of which involves a central crisis. Adequate resolution of each crisis leads to greater personal and social competence and a stronger foundation for solving future crises. In the first two stages, an infant must develop a sense of trust over mistrust and a sense of autonomy over shame and doubt. In early childhood, the focus of the third stage is on developing initiative and avoiding feelings of guilt. In the child's elementary school years, the fourth stage involves achieving a sense of industry and avoiding feelings of inferiority. In the fifth stage, identity versus role confusion, adolescents consciously attempt to solidify their identity. According to Marcia, these efforts may lead to identity diffusion, foreclosure, moratorium, or achievement. Erikson's three stages of adulthood involve struggles to achieve intimacy, generativity, and integrity. No matter what your identity outcome is, having strong positive feelings about your own ethnic group seems to be important for good mental health as well as for engagement and success in school.

How does self-concept change as children develop? Self-concept (definition of self) becomes increasingly complex, differentiated, and abstract as we mature. Self-concept evolves through constant self-reflection, social interaction, and experiences in and out of school. Students develop a self-concept by comparing themselves to personal (internal) standards and social (external) standards. Self-concepts in specific academic areas (math, languages, science, etc.) are related to performance in those areas. Gender and ethnic stereotypes are significant factors as well.

What is self-esteem? In the hierarchical model of self-concept, self-esteem is at the top. Self-esteem is an overall judgment of self-worth that includes feeling proud or ashamed of yourself as a person. Thus self-esteem is the *evaluative* dimension of self-concept. Self-concept and self-esteem are often used interchangeably, even though they have distinct meanings. Self-concept is a cognitive structure, and self-esteem is the evaluative component of self-concept.

Are there differences in self-concepts for girls and boys? From 1st to 12th grades, competence beliefs decline for both boys and girls in math, language arts, and sports. By high school, boys and girls express about the same competence in math; girls feel more competent in language arts and boys in sports. In terms of general self-esteem, both boys and girls report declines during the transition to middle school, but boys' self-esteem goes up in high school, whereas girls' self-esteem stays lower.

MODULE 14 Social and Moral Development

Learning Objective 4.4 Explain theories of moral development including those of Kohlberg, Gilligan, Nucci, and Haidt, and discuss how teachers can deal with one moral challenge for students—cheating.

Understanding Others and Moral Development

As we seek our own identity and form conceptions of ourselves, we are also learning about right and wrong. One aspect of moral development is understanding other people: How do we learn to interpret what others are thinking and feeling?

Theory of Mind and Intention

By the time they are 2 or 3 years old, children are beginning to develop a **theory of mind**, an understanding that other people are people, too, with their own minds, thoughts, feelings, beliefs, desires, and perceptions. Children need a theory of mind to make sense of other people's behavior. Why is Sarah crying? Does she feel sad because no one will play with her? And they need a theory of mind to devise plausible lies—they have to understand what other people might believe. We all need a theory of mind to understand that beliefs can differ from reality, that people can have different views, that people can conceal their true feelings, and that people can mean the opposite of what they say when they are being sarcastic (Berger, 2015; Carlson et al., 2013; Peterson & Wellman, 2019). One explanation for autism is that children with this condition lack a theory of mind to help them understand either their own or other people's emotions and behaviors.

Theory of mind
An understanding that other people are people, too, with their own minds, thoughts, feelings, beliefs, desires, and perceptions.

Around the age of 2, children have a sense of intention, at least of their own intentions. They will announce, "I wanna peanut butter sandwich." As children develop a theory of mind, they also can understand that other people have intentions of their own. Older preschoolers who get along well with their peers can separate intentional from unintentional actions and react accordingly. For example, they will not get angry when another child accidentally knocks over their block tower. But aggressive children have more trouble assessing intention. They are likely to attack anyone who topples their tower, even accidentally (Dodge & Pettit, 2003). As children mature, they are more able to assess and consider the intentions of others.

With a developing theory of mind, children are increasingly able to understand that other people have different feelings and experiences and therefore may have different viewpoints or perspectives. This **perspective-taking ability** develops over time until it is quite sophisticated in adults. Being able to understand how others might think and feel is important in fostering cooperation and moral development, reducing prejudice, resolving conflicts, and encouraging positive social behaviors in general (Gehlbach, 2004). Some coaching in perspective taking from the teacher ("How would you feel if…?" "Why do you think Charice…?") might help when children mistreat peers and the mistreatment is not part of a deeper emotional or behavioral disorder (Woolfolk & Perry, 2015).

Perspective-taking ability
Understanding that others have different feelings and experiences.

Moral reasoning
The thinking process involved in judgments about questions of right and wrong.

Moral Development

Along with a more advanced theory of mind and an understanding of intention, children also are developing a sense of right and wrong. Until recently, theory and research about moral development focused on children's **moral reasoning**, their thinking about right and wrong. Lately, some new perspectives that build on insights from social and evolutionary psychology and neuroscience suggest there is more to morality than thinking (Haidt, 2013; Messina & Surprenant, 2015), as you will see later in this section. First, let's look at the most famous conception of moral development based on reasoning—Kohlberg's theory.

KOHLBERG'S THEORIES OF MORAL DEVELOPMENT. For years, Lawrence Kohlberg's (1963, 1975, 1981) theory of moral development, which was based in part on Piaget's ideas, dominated psychology and education.

Put Yourself in His Place A man's wife is dying. There is one drug that could save her, but it is very expensive, and the druggist who invented it will not sell it at a price low enough for the man to afford it. Finally, the man becomes desperate and considers stealing the drug for his wife. What should he do, and why?

Kohlberg evaluated the moral reasoning of both children and adults by presenting them with **moral dilemmas**, or hypothetical situations like the one in *Put Yourself in His Place* in which people must make difficult decisions and give their reasons.

Moral dilemma
Situations in which no choice is clearly and indisputably right.

Based on their reasoning, Kohlberg proposed a detailed sequence of six stages of moral reasonings, or judgments about right and wrong:

Preconventional Level: Judgment Is Based Solely on a Person's Own Needs and Perceptions

- Stage 1: *Obedience Orientation*—Obey rules to avoid punishments and bad consequences.
- Stage 2: *Rewards/Exchange Orientation*—Right and wrong are determined by personal needs and wants: "If I want it, it is right."

Conventional Level: The Expectations of Society and Laws Are Taken into Account

- Stage 3: *Being Nice/Relationships Orientation*—Being good means being nice and pleasing others.
- Stage 4: *Law and Order Orientation*—Laws and authorities must be obeyed; the social system must be maintained.

Postconventional (Principled) Level: Judgments Are Based on Abstract, More Personal Principles of Justice That Are Not Necessarily Defined by Society's Laws

- Stage 5: *Social Contract Orientation*—The moral choice is determined by socially agreed-upon standards—"the greatest good for the greatest number."
- Stage 6: *Universal Ethical Principles Orientation*—There are universal principles of human dignity and social justice that individuals should uphold, regardless of the law and no matter what other people say.

Moral reasoning is related to both cognitive and emotional development. Abstract thinking becomes increasingly important in the higher stages of moral development, as children move from decisions based on absolute rules to those based on abstract principles such as justice and mercy. The ability to see another's perspective, to judge intentions, and to use formal-operational thinking to imagine alternative bases for laws and rules also enters into judgments at the higher stages.

CRITICISMS OF KOHLBERG'S THEORY. In reality, Kohlberg's stages do not seem to be separate, sequenced, and consistent. People often give reasons for moral choices that reflect several different stages simultaneously. Or a person's choices in one instance may fit one stage, and his or her decisions in a different situation may reflect another stage. Thus, moral decisions often are based on the situation, not on reasoning at a particular level: The reasons are made up after the fact. One of the most hotly debated criticisms of Kohlberg's theory is that the stages are biased in favor of Western male values that emphasize individualism. His stages do not represent the way moral reasoning develops either in women or in other cultures because the stage theory was based on a longitudinal study of American men only (Gilligan, 1982; Gilligan & Attanucci, 1988; Messina & Surprenant, 2015).

Carol Gilligan (1982) proposed a different sequence of moral development, an "ethic of care." Gilligan suggested that individuals move from a focus on self-interest to moral reasoning based on commitment to specific individuals and relationships and then on to the highest level of morality based on the principles of responsibility and care for all people. A meta-analysis that combined the results of 113 studies found only small differences in moral orientation between men and women (Jaffee & Hyde, 2000). Both men and women use *care* to reason about interpersonal dilemmas and *justice* to reason about societal dilemmas, but women may use care to reason more about actual dilemmas in their own lives. It appears that moral reasoning is more strongly influenced by the context and content of the dilemma than by the gender of the reasoner (Siegler et al., 2020).

Caring for students and helping students learn to care have become goals for many educators (Goldstein & Lake, 2000). Nel Noddings (1995) urged that "themes of care" be used to organize the curriculum. Possible themes include "Caring for Self," "Caring for Family and Friends," and "Caring for Strangers and the World." Within the theme of "Caring for Strangers and the World," there could be units on crime, war, poverty, tolerance, ecology, immigrants, responses to COVID and other pandemics, and technology. For example, the

events after massive destructive tornadoes and hurricanes in the United States or civil wars in the Middle East that left thousands homeless or refugees might be starting points for these units.

Another criticism of Kohlberg's stages is that they mix up moral judgments with decisions about social conventions and overlook personal choice—distinctions described next.

Moral Judgments, Social Conventions, and Personal Choices

Stop & Think

1. If there were no law against it, would it be OK to blind someone?
2. If there were no rule against it, would it be OK to chew gum in class?
3. Who should decide your favorite vegetable or how to style your hair?

We probably could agree that blinding someone is wrong, breaking class rules is wrong, and dictating food preferences or hairstyles for other people is wrong, but the "wrong" is different in each case. The first question is about actions that are inherently immoral. The answer to the question is concerned with conceptions of justice, fairness, human rights, and human welfare. Even young children know that hurting other people or stealing from them is not OK—law or no law. But some rules, like no gum chewing in question 2, are **social conventions**—agreed-upon rules and ways of doing things in a particular situation. Students (mostly) avoid chewing gum when the class rules (conventions) say not to. It is not inherently immoral to chew gum; it is just against the rules. Some classes—in college, for example—work well using different rules. And it is not immoral to dislike lima beans (at least I hope not) or to wear your hair long if you are a man; these are *personal choices*—individual preferences and private issues.

Social conventions
Agreed-upon rules and ways of doing things in a particular situation.

Larry Nucci (2001, 2009; Nucci & Ilten-Gee, 2018) offers an explanation of moral development that covers all three domains or areas: *moral judgments*, *social conventions*, and *personal choice*. Children's thinking and reasoning develop across all domains, but the pace of development may not be the same in every area. Even the cognitive (neurological) processing of judgments in the moral and conventional domains differs (Lahat et al., 2013). By about age 4, children around the world make fairly firm distinctions between moral and conventional issues (Nucci, 2009).

For teachers, the most common "right and wrong" situations involve the moral and conventional domains.

MORAL VERSUS CONVENTIONAL DOMAINS. In the *moral domain*, two fundamental issues are justice and welfare/compassion (Nucci, 2009). Some of the earliest moral issues in classrooms involve dividing and sharing materials, or **distributive justice** (Damon, 1994). For young children (ages 5 to 6), fair distribution is based on equality; thus, teachers often hear, "Keshawn got more than I did—that's not fair!" In the next few years, children come to recognize that some people should get more based on merit—they worked harder or performed better. Around age 8, children can take need into account and can reason based on *benevolence*: They can understand that some students might get more time or resources from the teacher because those students have special needs. So children move through the following stages in reasoning about moral issues:

Distributive justice
Beliefs about how to divide materials or privileges fairly among members of a group; follows a sequence of development from equality to merit to benevolence.

- A sense that justice means equal treatment for all;
- An appreciation of equity and special needs;
- A more abstract integration of equity and equality along with a sense of caring in social relations; and, finally,
- As adults, a sense that morality involves both benevolence and fairness and that moral principles are independent of the norms of any particular group (Nucci, 2001, 2009; Nucci & Ilten-Gee, 2018).

Moral realism
Stage of development wherein children see rules as absolute.

In the *conventional domain*, children begin by believing that rules simply exist. For example, if you have spent time with young children, you know that there is a period when you can say, "Eating in front of the TV is not allowed!" and get away with it. Piaget (1965) called this the state of **moral realism**. At this stage, the child believes that rules about conduct or rules about how to play a game are absolute and can't be changed. If a rule is broken, the child believes that the punishment should be determined by how much damage is done, not by the intention of the child or by other circumstances. So accidentally breaking three cups is worse than intentionally breaking one, and in the child's eyes, the punishment for the three-cup offense should be greater.

Morality of cooperation
Stage of development wherein children realize that people make rules and people can change them.

As children interact with others, develop their theory of mind, and see that different people have different rules, there is a gradual shift to a **morality of cooperation**. Children come to understand that people make rules and people can change them. When rules are broken, both the damage done and the intention of the offender are taken into account.

As they mature, children understand that rules, even though they are arbitrary, are made to maintain order and that people in charge make the rules. Then, as students move through adolescence, they swing from understanding conventions as the appropriate ways to operate in a social system to viewing conventions as nothing but society's standards that have become set because they are widely applied and seldom challenged. Finally, adults realize that conventions are useful in coordinating social life but are changeable, too. So, compared to young children, older adolescents and adults generally are more accepting of others who think differently about conventions and customs.

IMPLICATIONS FOR TEACHERS. In his book *Nice Is Not Enough*, Larry Nucci (2009) describes many specific K–12 lessons that integrate academic content with development in the three domains of *moral judgments, social conventions*, and *personal choices*. The algebra lesson shown in Table 4.5 provides an example lesson.

Nucci also offers several suggestions for creating a moral climate in your classroom. First, it is important to establish a community of mutual respect and warmth with a fair and consistent application of the rules. Without that kind of community, all your attempts to create a moral climate will be undermined. Second, teachers' responses to students should be

Table 4.5 An Algebra Lesson That Also Encourages Making Moral Judgments

Students are given this scenario to discuss in pairs:

Four kids who are neighbors (John, Mark, Sally, and Mary) decide to work together on a paper route to make some money. John and Mary are both 15 and in high school, while Mark and Sally are both 12 years old and seventh graders. At the end of their first week they earn $48. But now they have a problem. They didn't decide ahead of time how to divide up the money that they had earned.

a. Sally argues that the fairest way is to divide up the money equally.

b. Mary argues that Sally was lazy and only delivered half as many papers as Mary. So Sally should get half as much as Mary and the other kids.

c. Mark argues that he and John were stronger than Mary and Sally, who are girls, and together carried 25% more than the girls did altogether. So the boys should each get 25% more than each of the girls.

d. John agrees that the reason Sally carried fewer papers than Mary is that she is lazy. He also argues that even though Mary isn't as strong as the boys, she worked just as hard. However, he also argues that the older kids (he and Mary) should get 25% more than the younger kids because older kids have more expenses than younger ones do. So, in his mind, he and Mary should get the same amount and 25% more than Mark, but Sally should get half as much as Mark because she was lazy.

The Assignment

1. Please create algebraic equations that would express each solution for the best way to divide the $48.

2. Provide a written answer for the solution you and your partner think is the fairest.

3. Explain why you think that is the fairest solution, and provide your argument as to why the other solutions are not as fair.

Source: Nucci, L. (2009). *Nice is not enough: Facilitating moral development* (pp. 156–157). Upper Saddle River, NJ: Pearson.

appropriate to the domain of the behavior—moral or conventional. For example, here are some responses to moral issues (Nucci, 2001, p. 146):

1. When an act is inherently hurtful or unjust, emphasize the harm done to others: "John, that really hurt Jamal."
2. Encourage perspective taking: "Ivy, how would you feel if someone stole from you?"

In contrast, here are two responses to rules or conventional issues:

1. Restate the rule: "Rosa, you are not allowed to be out of your seat during announcements."
2. Command: "Howie, stop swearing!"

In all four cases, the teacher's response fits the domain. To create an inappropriate response, just switch responses 1 or 2 with those for 3 or 4. For example, "Rosa, how would you feel if other people got out of their seats during announcements?" Rosa might feel just fine. And saying, "John, it is against the rules to hit" is a weak response to a moral transgression: Hitting is more than against the rules—it hurts and is wrong.

In the third domain—personal—children must sort out what decisions and actions are their personal choices and what decisions are outside personal choice. This process is the foundation for developing moral concepts related to individual rights, fairness, and democracy. Here, diverse cultures may have very different understandings about individual choice, privacy, and the role of individuality in the larger society.

Connect and Extend to PRAXIS II®

Moral Development (I, A2)

Moral issues can have important impacts on the classroom. Identify major issues related to moral development, and explain what a teacher can do to appropriately address these issues.

Beyond Reasoning: Haidt's Social Intuitionist Model of Moral Psychology

In everyday life, making moral choices involves more than reasoning. Emotions, instincts, competing goals, relationships, and practical considerations all affect choices. Jonathan Haidt (2012, 2013) believes that Kohlberg overemphasized cold cognitive reasoning about morality. Haidt's Social Intuitionist Model is based on research in social and evolutionary psychology and neuroscience. The model has three key principles:

1. *Intuition comes first, reasoning second.* Moral reasoning is something we do only after a first, automatic, emotional response (call it intuition) has pushed us toward a moral judgment of right or wrong. We instinctively feel sympathy–disgust, like–dislike, attraction–revulsion, and so on, in response to a situation or dilemma. Then we reason about why our reaction is right as we prepare to defend the choice to others, so reasoning plays a social role of maintaining our position and respect in our group. As we will see several times in this text, current perspectives on cognition decision making based on neuroscience include *dual-process models* with one system that is fast, automatic, and strongly affected by emotions and a second system that is slower, more analytic, and reflective. These dual-processing systems are at work in all human decisions and choices—including moral judgments.
2. *There is more to morality than fairness and harm.* Most theories of moral reasoning are grounded in the moral values of justice (fairness/cheating) and welfare (care/harm). Haidt believes that focusing on only these values reflects a WEIRD moral framework (Western, educated, industrialized, rich, and democratic). In WEIRD cultures, justice and human welfare are central to morality. But Haidt's research with participants around the world has identified four other important moral values or moral foundations:
   - *Loyalty/betrayal* underlies self-sacrifice for the good of the group, patriotism, and ideas such as "no Marine left behind."
   - *Authority/subversion* is the foundation of leadership and followership—respect for legitimate authority.
   - *Sanctity/degradation* is the foundation for striving to live a more noble and clean life and avoid contamination. Sanctity determines what objects or ideas are sacred and which ones are disgusting.

- One other candidate for a moral foundation is *liberty/oppression*, the basis for resentment and resistance to domination, such as a hatred for bullies and dictators.

  These moral foundations are present in all cultures because they evolved over thousands of years as humans lived in social groups and sought to survive. Cultures may have different ways of enacting these moral foundations, however. For example, many people in India believe the cow is sacred, and for many people in the United States, the flag is sacred. So many Indians feel disgust at harming a cow, and many Americans feel disgust when they see the U.S. flag burned. See https://moralfoundations.org for a description of the moral foundations.

3. *Morality binds and blinds.* When individuals in a group share the same symbols of the sacred, heroes, leaders, beliefs about right and wrong—in short, when they share the same moral beliefs—then the group is bound together. They are loyal to each other—"one for all and all for one." They respect their leaders and each other. But in being bound together (and therefore being more likely to survive), they are blind to the moral beliefs of other groups that seem so "wrong."

The Social Intuitionist Model is quite new, so there are few applications to education. The advantage of the model is that it incorporates insights from neuroscience, social psychology, and sociobiology. The model reminds us that there is more to morality than reasoning. We have an immediate, instinctive reaction about what is right and wrong, and then we "reason" to justify our choice. Justifying our choices maintains our position in our group, which has helped humans survive over centuries. Moral education probably needs to acknowledge the foundations of morality beyond justice and welfare and also understand the ways that different cultures and groups enact those moral beliefs. Current social and emotional learning approaches emphasize feelings as well as valuing relationships (Shechtman & Yaman, 2012).

Moral Behavior and the Example of Cheating

Three important influences on moral behavior are modeling, internalization, and self-concept. First, children who have been consistently exposed to caring, generous adult models will tend to be more concerned for the rights and feelings of others (Eisenberg & Fabes, 1998; Woolfolk & Perry, 2015). Second, most theories of moral behavior assume that young children's moral behavior is first controlled by others through direct instruction, supervision, rewards and punishments, and correction. But in time, children **internalize** the moral rules and principles of the authority figures who have guided them; that is, children adopt the external standards as their own. If children are given reasons they can understand when they are corrected—particularly reasons that highlight the effects of their actions on others—then the children are more likely to internalize moral principles. They learn to behave morally even when "no one is watching" (Hoffman, 2000).

Internalize
Process whereby children adopt external standards as their own.

Finally, we must integrate moral beliefs and values into our total sense of who we are, our self-concept. "The tendency for a person to behave morally is largely dependent on the extent to which moral beliefs and values are integrated in the personality, and in one's sense of self" (Arnold, 2000, p. 372).

WHO CHEATS? About 75% to 98% of college students report that they cheated in high school even if they believed that cheating was wrong. In fact, the rates of academic cheating have been rising for the past 30 years, perhaps in response to increased pressures and high-stakes testing and the ease of cheating using the Internet (Anderman, 2015; Stephens & Wangaard, 2016).

There are some individual differences in cheating. Most studies of adolescent and college-age students find that men are more likely to cheat than women and that lower-achieving students are more likely to cheat than higher achievers. Students focusing on performance goals (making good grades, looking smart) as opposed to learning goals, students with a low sense of academic self-efficacy (a belief that they probably can't do well in school), and students who are impulsive are more likely to cheat. Finally, students who

are higher on the personality traits of conscientiousness and agreeableness are less likely to cheat (Giluk & Postlethwaite, 2015).

But cheating is not all about individual differences—the situation plays a role as well. In one study, the level of cheating decreased when students moved from math classes that emphasized competition and grades to classes that emphasized understanding and mastery (Anderman & Midgley, 2004). If students trust the teacher as a credible source, they may be less likely to cheat because they value the content being taught and want to actually learn it (Anderman et al., 2009). In addition, students are particularly likely to cheat when they are behind or "cramming for tests" or when they believe that their teachers do not care about them. For example, Erica had this perspective:

> I am a high school honors student, and I think there are different degrees of cheating. I'm a dedicated student, but when my history teacher bombards me with 50 questions due tomorrow or when a teacher gives me a fill-in-the-blanks worksheet on a night when I have swim practice, church, aerobics—and other homework—I'm going to copy from a friend!… Since I only do this when I need to, it isn't a habit. Every kid does this when they're in a pinch. (Jensen et al., 2002, p. 210)

Tamera Murdock and Eric Anderman (2006) have proposed a model for integrating what we know about cheating. They suggest that when deciding to cheat, students ask themselves three questions: What is my goal? Can I do this? What are the costs? See Table 4.6 for some example answers to these questions that might be associated with decisions about whether to cheat and some example strategies to support *not* cheating.

DEALING WITH CHEATING. The implications for teachers are straightforward. To prevent cheating, try to avoid putting students in high-pressure situations. Make sure they are well prepared for tests, projects, and assignments so they can do reasonably well without cheating. Be a trustworthy and credible source of information. Focus on learning and not on grades. Encourage collaboration on assignments, and experiment with open-book, collaborative, or take-home tests. I often tell my students what concepts will be on the test and encourage them to discuss the concepts and their applications before the test. You might also make extra help available for those who need it. Be clear about your policies in regard to cheating, and enforce them consistently. Help students to resist temptation by monitoring them carefully during testing.

Table 4.6 When Do Students Cheat?

Tamera Murdock and Eric Anderman have developed a model of academic cheating based on the answers to three questions.

QUESTIONS	LESS LIKELY TO CHEAT: EXAMPLE ANSWERS	MORE LIKELY TO CHEAT: EXAMPLE ANSWERS	WHAT CAN THE TEACHER DO? EXAMPLE STRATEGIES
What is my goal?	My goal is to learn, get smarter, and be the best I can be.	My goal is to look good, to outperform others.	Communicate that the point of the class is to learn—everyone can get better.
Can I do this?	I can do this with reasonable effort.	I doubt my ability to do this.	Build students' confidence by helping them take small but successful steps. Point out students' past accomplishments.
What are the costs?	I will get caught and punished if I cheat. I will feel morally wrong or dishonored if I cheat.	I probably won't get caught and punished if I cheat. Everyone cheats, so it can't be wrong. The pressure is too great—I can't fail. I have to cheat.	Make mistakes an opportunity to learn. Take the pressure out of assignments by allowing students to revise their work. Avoid giving high-stakes tests and assignments. Provide grades privately. Monitor students to prevent cheating, and follow through with reasonable penalties.

Source: Adapted from Murdock and Anderman (2006).

Another option is to conduct an Achieving with Integrity (AwI) seminar (Stephens & Wangaard, 2016). These seminars have four components:

1. *Moral Awareness:* Seeing the moral dimension in a situation, such as when a friend asks to copy your homework.
2. *Moral Judgment:* Using moral reasoning, as described by Kohlberg or Nucci, to decide on the best course of action.
3. *Moral Commitment:* Taking personal responsibility, making a commitment to not cheat, to act with integrity.
4. *Moral Action:* Following through, acting on your commitment.

The actual AwI seminar is conducted not through lecture but with discussion: analyzing cases and situations and answering core questions such as: *Awareness*—"What is moral? Is this a moral situation?" *Judgment*—"Was that decision right?" *Commitment*—"Why should I do the right thing?" *Action*—"How would I actually do the right thing in this situation? What skill would be needed?" The creators of the AwI seminar suggest that the same framework could be used to address other moral issues such as bullying, stealing, lying, and drug use.

Personal/Social Development: Lessons for Teachers

Both Erikson and Bronfenbrenner stress that individuals are influenced by their social and cultural contexts. For example, here are a few big ideas:

1. All students benefit from authoritative teachers who are both warm and clear about requirements.
2. For all students, self-concepts are increasingly differentiated over time—students may feel competent in one subject but not in others or feel very capable as friends or family members but not capable in schoolwork.
3. For all students, it is a challenge to forge a meaningful identity that integrates their decisions about career, religion, ethnicity, gender roles, and connection to society. Teachers are in a position to support this quest.
4. Being rejected by peers is harmful for all students. Many students need guidance in developing social skills, in more accurately reading the intentions of others, in resolving conflicts, and in coping with aggression. Again, teachers can provide guidance; integrated social and emotional learning can help.
5. When working under high pressure, with unreasonable workloads, and with little chance of being caught, many students will cheat. Teachers and schools are responsible for preventing these conditions.

Module 14 Summary

Understanding Others and Moral Development (pp. 170–178)

What is a theory of mind, and why is it important? A theory of mind is an understanding that other people are people, too, with their own minds, thoughts, feelings, beliefs, desires, and perceptions. Children need a theory of mind to make sense of other people's behavior. As children develop a theory of mind, they can also understand that other people have intentions of their own.

How do perspective-taking skills change as children mature? An understanding of intentions develops as children mature, but aggressive children often have trouble understanding the intentions of others. Social perspective taking also changes as we mature. Young children believe that everyone has the same thoughts and feelings as they do. Later, they learn that others have separate identities and, therefore, separate feelings and perspectives.

What are the key differences among the preconventional, conventional, and postconventional levels of moral reasoning? Kohlberg's theory of moral development includes three levels: (a) a preconventional level, where judgments are based on self-interest; (b) a conventional level, where judgments are based on traditional family values and social expectations; and (c) a postconventional level, where judgments are based on more abstract and personal ethical principles. Critics suggest that Kohlberg's view does not account for possible cultural differences in moral reasoning or differences between moral reasoning and moral behavior.

Describe Gilligan's levels of moral reasoning. Carol Gilligan has suggested that because Kohlberg's stage theory was based on a longitudinal study of men only, it is very possible that the moral reasoning of women and the stages of women's development are not adequately represented. She has proposed an "ethic of care" in which individuals move from a focus on self-interest to moral reasoning based on commitments to specific individuals and relationships and then to the highest level of morality, based on the principles of responsibility and care for all people.

How does thinking in the moral and conventional domains change over time? Beliefs about morality move from the young child's sense that justice means equal treatment for all to the adult's understanding that morality involves beneficence and fairness and that moral principles are independent of the norms of any particular group. When thinking about social conventions, children begin by believing that the regularities they see are real and right. After going through several stages, adults realize that conventions are useful for coordinating social life but changeable, too.

What has Haidt added to our understanding of moral behavior? In everyday life, making moral choices involves emotions, instincts, competing goals, relationships, and practical considerations. Haidt suggests that instincts in relation to fairness, loyalty, authority, a sense of the sacred, and liberty lead to more automatic, emotional reactions to moral situations, and then we construct reasons for our reactions. Cultures vary in their moral values. These values bind groups together but also blind them to the moral beliefs of other groups.

What influences moral behavior? Adults first control young children's moral behavior through direct instruction, supervision, rewards and punishments, and correction. A second important influence on the development of moral behavior is modeling. Children who have been consistently exposed to caring, generous adult models will tend to be more concerned about the rights and feelings of others.

Why do students cheat? In schools, cheating is a common behavior problem that involves moral issues. The decision to cheat is based on three questions: What is my goal? Can I do this? What are the costs? Cheating is caused by both individual and situational factors, but if the pressure is great enough and the chance of getting caught is slim, many students will cheat.

Cluster 4 Review

Key Terms

Anorexia nervosa
Attachment
Autonomy
Binge eating disorder
Bioecological model
Blended families
Bulimia nervosa
Commitment
Context
Cyber aggression
Developmental crisis
Distributive justice
Exploration
Extended families
Generativity
Hostile aggression
Identity
Identity achievement
Identity diffusion
Identity foreclosure
Industry
Initiative
Instrumental aggression
Integrity

Internalize
Intimacy
Mandated reporting
Menarche
Moral dilemmas
Moral realism
Moral reasoning
Morality of cooperation
Moratorium
Overt aggression
Parenting styles
Peer cultures
Perspective-taking ability
Psychosocial
Puberty
Racial and ethnic pride
Relational aggression
Self-concept
Self-esteem
Social conventions
Spermarche
Theory of mind

Connect and Extend to Licensure

Multiple-Choice Questions

1. Authoritative teaching strategies are associated with what students identify as "good teachers." Identify which one of the following educators is demonstrating authoritative techniques in the classroom.

   A. When Marcus failed to take his seat upon entering the room, Miss Thomas reminded him of the class rules and consequences.

   B. Paulo, a shy new student to the class, was forced by Mr. Hall on his first day in his new school to give a speech about his past experiences in Guatemala.

   C. Dina was allowed by her teacher to skip recess and play inside by herself because she did not have any friends.

   D. Mr. Krall allowed the students to have two free days at the beginning of the year in which to become acquainted with their peers in the classroom.

2. When new students arrive in Ms. Taylor's class, she understands that they may initially have adjustment issues. In addition to pairing new students with partners to assist them in navigating Central Middle School, she also makes sure she addresses their psychosocial needs. Which one of the following strategies would be appropriate for a new student in Ms. Taylor's middle school class?

   A. Allow the students to plan what they would like to do during their first day at school.

   B. Encourage the students to take responsibility for their own personal needs.

   C. Provide support so that new students can feel a sense of competence and success.

   D. Let students know that the relationships they make in middle school are important to their emotional well-being and happiness later in life.

3. Research suggests that a majority of students cheat at some point in their academic careers. Which one of the following is not a recommendation to reduce cheating in the classroom?

   A. Clear guidelines on what constitutes cheating, accompanied by consequences that, when imposed, will deter other students because of their severity.

   B. Reduce the focus on grades, and provide the material for students with which they must be familiar.

   C. Encourage collaboration with peers on assignments to provide necessary support and decrease anxiety.

   D. Ensure students are well prepared for assignments and tests.

Constructed-Response Questions

Case

Suzanne Wilson entered Ms. Sullivan's class in the fall without any friends. While many of the third-graders engaged in collaborative games on the playground, Suzanne stood on the periphery, and the other students did not include her. In class her behaviors were more typical of a younger child: sucking her thumb when she became upset and refusing to share during group activities. By December, Ms. Sullivan decided to take steps to intervene. She called Mr. and Mrs. Wilson for a parent meeting. When the Wilsons arrived, Suzanne was with them. What then transpired was shocking to Ms. Sullivan. Suzanne adamantly insisted that her parents not talk with her teacher in private. Yelling above the crying and screaming, the Wilsons apologized and suggested they return on another day when Suzanne was feeling more agreeable.

4. Identify and explain the parenting style the Wilsons appear to practice.
5. What strategies should Ms. Sullivan employ to assist Suzanne with her emotional development?

What Would They Do?

Teachers' Casebook: Mean Girls

At the beginning of this cluster, we asked you to think critically about Jasmine and the clique of "mean girls." Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Ashley Richardson • 6th–8th Grade Dean of Instruction and Discipline

Lansing Charter Academy, Lansing, MI

I would give each student their due processes by investigating and interviewing each student involved. During this process, I would ask students who passed notes or posted on social media. Many times, the "mean girls" cliques have participants and bystanders, so I would bring each student in separately so they could give their interpretations, and I would see who had which role in this incident against Jasmine.

I have found that students who bully other students do not realize how harmful their actions can be, and I would not mince words as I read a few examples of how their words and actions could lead to physical harm from either Jasmine or peers who listen to them. I would explain that worse is possible. Jasmine could take her own life from the agony they have caused her. After determining each girl's role, I would issue school suspensions with a parent/guardian conference with a restorative meeting with all the girls and their parents upon reentry. The students who committed the acts of posting on social media or passing notes would receive more days of suspension than the bystanders.

I wouldn't say anything to the other students. Their absence would speak for itself. It is evident that Jasmine is already embarrassed enough, and we don't want to add to her anxiety by spreading her business to students who may not have heard what is going on.

I would bring in the local police to speak on bullying and their role when cases reach their department. I would want to showcase the seriousness of incidents like these, and how some parents are unforgiving when they have children who are being bullied and may press charges against them.

Demetrick Tensley • 6th–8th Grade Business Education and Computer Science Teacher

Seneca Middle School, Seneca, SC

The "mean" girls' actions were intended to mistreat a peer who was vulnerable. Unfortunately, these types of bullying scenarios are prevalent, impacting many children regardless of their gender or age. Such a widespread problem requires a multileveled and comprehensive response. As these behaviors are occurring outside of the classroom, an initial and minimal level response would be to report the information to administration, guidance, and the school resource officer (there may be a criminal component, as unclothed pictures of a minor were sent to others). As an educator, I cannot expect the administration to resolve the issue of bullying alone. To establish a framework for school-wide prevention of bullying behaviors will take a team. After reporting this behavior, we would work as a team to come up with consequences and solutions for this group of girls. As a follow-up with my class, we would discuss school policy related to bullying. Within this discussion, I would make sure students understand that it is important to report bullying to an adult. I would also encourage students to share their feelings on bullying. After sharing, we would come up with ways to make our school a bully-free zone. As bullying often occurs outside of the classroom, a partnership between administrators, educators, and students to create a framework for school-wide prevention of bullying is key. To make impactful and sustainable positive change a framework such as Positive Behavioral Interventions and Supports can be implemented throughout school districts.

Cory Hilty • 5th Grade Teacher

Tyler Run Elementary School, Powell, OH

My response to this case study is a bit broader and more contextual, in order to provide a response that may be beneficial in more situations than just the one described. Assuming that this issue has already been discussed with administration, guardians, and any other needed party, the classroom teacher has an immense responsibility to help each of these students respond to her own actions and the actions of others, and with any luck, grow and develop these social skills for the betterment of their future. Because of the teacher's role in assisting students to develop social and emotional skills that benefit the student and others they come into contact with, the teacher in this scenario should already have an avenue to handle such topics in the natural classroom setting. A simple way to address a large number of issues such as work ethic, patience, kindness, social media use, gossip, etc. is to establish a routine of selecting one day a week when the class uses the beginning of the period to focus on such topics. Specifically, the teacher can direct students to discuss a quote, song lyric, painting, story, poem, or any medium that intrigues students to think about how they can prepare themselves to react appropriately in the tense time that is middle school. By doing so, the teacher allows students to bounce ideas off of their peers and a trusted adult so that they may discover and practice the right way to move forward, address disagreements, and develop skills that are successful and positive. At the same time, when issues such as this arise, the teacher has already established a natural place that is safe and comfortable for students to address issues appropriately and discover productive ways to move forward for the benefit of everyone.

Lucy Ordaz Sanchez • 7th–8th Grade Family and Consumer Science Teacher

Dixon Middle School, Provo, UT

I had a similar situation in my class. As soon as I saw the group of friends separate, I mentioned how I missed seeing them all together and asked if everything was OK. I talked to each side and listened. (Listen before you jump to give advice.) I called the student who had been absent and her mom to discuss the situation, then suggested they visit with a school counselor. At different points I asked if both parties were interested in hearing my thoughts. I shared a personal experience from my middle school years to try to relate and help them see how hurtful it can be to be on the receiving side and how friendships can be damaged due to misunderstandings and cruel actions. I later asked if they were interested in talking to me or a counselor about the situation as it made me sad to see them lose a friendship. They agreed to talk to me and for me to invite a school counselor to join in. After a few minutes, I excused myself. The counselor later mentioned that they had apologized to each other. As far as teaching the rest of my students regarding this matter, I often share things with my classes that are not directly related to the content area or the subject being discussed that day but they do know that I take the first 5 minutes to share or to listen about things that I feel need to be discussed. I briefly shared my story and asked all students to be kind to each other and avoid hurting others. This age group often doesn't realize how their actions can deeply hurt others; listening and making them aware of such hurt often is what is needed

Marianne Robinson • 4th–5th and 6th–7th Grade Teacher

Meadowbrook Elementary/Scott Creek Middle, Coquitlam
Edmonton, Alberta, Canada

To begin reconciliation immediately, Jasmine and her parents should meet with the school administrator and her classroom teacher to outline a return-to-school plan: half days building towards full days, counseling through the school, a restorative talking circle later on if she is comfortable speaking with the girls face-to-face with guided support, and follow-up meetings as needed. Having Jasmine's input about these possible solutions gives her agency in finding some power back from this very humiliating experience.

For the girls who caused harm, immediate intervention is required from the administration, classroom teachers and parents. My approach to reconciliation is blended, not everyone gets similar consequences. I'd look at each student/event on a case-by-case basis. All girls would be required to attend group meetings with a youth worker or counselor that would include discussions about privacy and, perhaps, an in-school suspension (i.e., working at the office or with the counselor for some period of time) for those who took and posted Jasmine's photo to social media. Follow-up care could look like group restorative work: a talking circle with Jasmine, and mandatory attendance in a digital footprint and privacy group led by the school youth worker for a prescribed amount of time. Parents could ensure the image of Jasmine is flagged on all platforms, deleted off all devices, and trash bins emptied on all devices and clouds so the image and screen shots could not be retrieved, a possible disabling of their social media accounts.

I'd promptly arrange a series of class meetings with my students to discuss what happened in general. Also, I'd deliver targeted lessons on privacy, digital footprints and safety, school policy, and consensual and nonconsensual image sharing; apply the learned knowledge to case studies; respond meaningfully to them; and discuss how we can implement this knowledge into the school culture: A digital privacy awareness day? Poster campaign? Assembly with a scheduled presenter about cyberbullying? Additionally, a dialogue of care can be woven into conversations throughout the year; targeted lessons on these topics can be covered in Career Education and Physical and Health Education.

Melodi Sterner • 6th–7th Grade Life Science and Skills for Adolescents Teacher

Riverwatch Middle School, Suwanee, GA

The first place I would go as a teacher, is directly to the counseling department. In the county I work in, you have to be careful how you solve problems, and how to speak to children. Parents don't, oftentimes, enjoy you bringing the truth to light. It is often vocalized as "not our place" and we are "parenting their children." It makes the response to this issue a bit tougher as a teacher. The counseling department is the first place to go, as they are equipped to solve the issue, and as middle school counselors, they are equipped to muddle through the numerous emotions at play with middle school girls. What I can help with in the classroom is to build Jasmine's self-esteem and self-worth, and de-value the message and actions of the other little girls. Notice I did not say de-value the self-esteem and self-worth of the other little girls. The old saying is true, "Hurting people hurt people." These little girls are hurting in another way, and it is coming out in a nasty way. They, too, need help with their self-esteem and self-worth. I would personally call Jasmine's family to check on all of them. I would express how much I, and other students miss her, how much she is valued. I would offer any help that the family might express they need. I would hand-write a personal note to Jasmine about how I am proud of her in my class this year, and how much I miss her, and mail it to her personally. I would take the first 10 minutes of class time, for as long as I needed to, and do a quick warm up that has to do with relationships and suitable technology use. I would hold a lunch bunch group with the girls, include Jasmine when she is at school, and form relationships with them. I also would create a girls' group to educate them on women, both current and in history, that have made a difference in this world. My hope would be to empower each little girl, give her strength in herself, and give her something to be proud of to deter her from comparing herself to others. This will help prevent putting others down. I found that many times, seeing students and educating students, while forming relationships with them, takes away the need and the power to bully.

Thomas Naismith • 7th–12th Grade Science Teacher
Slocum Independent School District, Elkhart, TX

To bring civility to this classroom, I would address the situation in two stages. First, I would meet individually with the two girls involved in the most recent incident. I would make it very clear to Maya that her behavior was totally inappropriate and that such behavior was far beneath her. I would suggest to her that I was sure that it was just a temporary lapse of good judgment on her part and that I was sure that such an incident would not occur again. I would also ask her to play a role in helping to stop some of the other inappropriate behavior that was occurring in my classroom.

I would explain to Jasmine that she did not need to be embarrassed, because her classmates would appreciate the fact that she had made an effort to restore an old "friendship." I would comment on her positive qualities, explain that she should feel good about herself, and suggest that she seek the companionship of students who are open to her friendship.

The second step would be to address the class as a whole. I would be nonspecific in my comments, but I would make it very clear that the gossip and other "ugly" behavior would need to stop. I would explain that our classroom is a mini-society and that every member has the responsibility of treating others appropriately. I would further explain that they did not have to be "friends" with everyone but should treat everyone with respect and dignity.

Jacalyn D. Walker • 8th Grade Science Teacher
Treasure Mountain Middle School, Park City, UT

Never work in a vacuum. This is especially important in a middle school or junior high school. Work with your school counselor, other grade-level teachers, and parents. If you are doing this, you will have several options for dealing with this problem. You cannot fake caring about 12-, 13-, and 14-year-olds. They can spot a fake. You must be working with this age group because you truly like them as people. You appreciate their humor and their abilities. With a caring, trusting, and respectful relationship, students will be open to your help and guidance. Parents are often not involved in the classroom at these grade levels, but there are great programs available to get parents involved.

Nancy Schaefer • 9th–12th Grade Teacher
Cincinnati Hills Christian Academy High School, Cincinnati, OH

I would first make a phone call to Jasmine's home. I would talk to one of her parents or guardians. My first goal would be to find out if the parents are aware of the situation. Sometimes girls like Jasmine are too embarrassed to tell their parents the whole story or even any of the real story. If the parents did not know the entire story, I might try to get Jasmine on the phone and help her tell her parents. Letting the adults around her know what has happened can relieve some of the shame she might be feeling.

I would then work with Jasmine and one or more of her parents to plan Jasmine's transition back to school. A school counselor might also be involved in this conversation. The adults would help Jasmine come up with a plan for how to handle possible difficult situations: face-to-face encounters with Maya, encounters with other old "friends," mean messages she might receive during the school day, or comments made to her by other students. We would help her think through these situations and practice how she could respond. I could talk to Jasmine's teachers to work on rearranging groups or seating to move the girls away from each other or to foster other friendships for Jasmine. Because almost everyone has stories about unfaithful friends, Jasmine might benefit from talking with a freshman or sophomore about that person's experiences and how he or she made new friends. Finally, I would try to arrange a brief and supervised meeting between Jasmine and Maya. Allowing an encounter to happen in a controlled environment would provide Jasmine an outlet to voice her hurt, without her having to resort to inappropriate actions.

During all of this, I would want to make sure that someone was also working with Maya to prevent the escalation of events. This may be an administrator responsible for discipline, if school rules were violated; the school counselor; or another teacher with a good relationship with Maya. I would encourage the involvement of Maya's parents, especially if this were not the first vicious episode.

Cluster 5

Learner Differences and Learning Needs



Jenny H., Age 5

Teachers' Casebook:

Including Every Student

What Would You Do?

Ahead of the new school year, you scan the list of students who will be registered in your classroom. You always expect to have students with diverse academic abilities, social skills, and motivation for learning. This year you will have a student with a chronic health concern, asthma; a student with autism spectrum disorder; a student with specific learning disabilities; and two students with ADHD. The class list has you feeling quite overwhelmed, but you believe in the district's policy of inclusion, so you begin planning for meeting the needs of these learners and *all* learners in your classroom.

Critical Thinking

- How will you design tasks and structure interactions with students to ensure they *all* make progress and learn to their full potential?
- What can you do to address the specific needs of students who have special education designations?
- How will you remain confident in your abilities to be effective in this situation?

Overview and Objectives

To answer the critical thinking questions, you need an understanding of individual differences. So far, we have not talked much about individuals. We have discussed principles of development that apply to everyone—stages, processes, conflicts, and tasks. Our development as human beings is similar in many ways but not in every way. Even among members of the same family, there are marked contrasts in appearance, interests, abilities, and temperaments, and these differences have important implications for teaching. We will spend some time analyzing the concepts of intelligence, creativity, and learning styles because these terms are so often misunderstood. You probably will have at least one student with special needs in your class, whatever grade you teach, so in this cluster we also explore both common and less frequently occurring learning problems. As we discuss each situation, we will consider how a teacher might recognize problems, seek help, and plan instruction, including using the approach of Response to Intervention (RtI). By the time you have completed this cluster, you should be able to:

5.1 Describe the advantages and disadvantages of labeling as well as the value of identity-first/person-first language in respecting the dignity of all students.

5.2 Describe current theories of intelligence including hierarchical and multiple theories of intelligence, emotional intelligence, how intelligence is measured, and what these measurements tell teachers.

5.3 Explain how creativity is defined, assessed, and encouraged in the classroom.

5.4 Discuss the problems with the measurement and application of learning styles and the appropriate uses of students' learning preferences.

5.5 Discuss the implications of the IDEA, Section 504 protections, and Response to Intervention for contemporary education.

5.6 Understand and address the special educational needs of students with learning challenges.

5.7 Recognize and respond to the special educational needs of students who are gifted and talented.

OUTLINE

Teachers' Casebook—Including Every Student: What Would You Do?
Overview and Objectives

MODULE 15: Language, Labels, and Intelligence
Language and Labeling
- Impairments, Disabilities, and Handicaps
- Person-First/Identity-First Language
- Possible Biases in the Application of Labels

Intelligence
- What Does Intelligence Mean?
- Another View: Gardner's Multiple Intelligences
- Multiple Intelligences: Lessons for Teachers
- Another View: Sternberg's Successful Intelligence
- Neuroscience and Intelligence
- Measuring Intelligence
- Sex Differences in Intelligence and Achievement
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MODULE 16: Creativity and Learning Styles
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- OK, But So What: Why Does Creativity Matter?
- What Are the Sources of Creativity?
- Creativity in the Classroom

Learning Styles: Proceed with Caution
- Learning Styles/Preferences
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MODULE 17: IDEA and Response to Intervention
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MODULE 18: Teaching Every Student
Students with Learning Challenges
- Neuroscience and Learning Challenges
- Students with Specific Learning Disabilities
- Students with Hyperactivity and Attention Disorders
- Lessons for Teachers: Learning Disabilities and ADHD
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- Students with Intellectual Disabilities
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- Autism Spectrum Disorders

MODULE 19: Recognizing and Teaching Students with Special Talents
Students Who Are Gifted and Talented
- Who Are These Students?
- Identifying Students Who Are Gifted and Talented
- Teaching Students with Gifts and Talents

Cluster 5 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Including Every Student: What Would They Do?

MODULE 15 Language, Labels, and Intelligence

Learning Objective 5.1 Describe the advantages and disadvantages of labeling as well as the value of identity-first/person-first language in respecting the dignity of all students.

Learning Objective 5.2 Describe current theories of intelligence including hierarchical and multiple theories of intelligence, emotional intelligence, how intelligence is measured, and what these measurements tell teachers.

Language and Labeling

Every child is a distinctive collection of talents, abilities, and limitations. In that sense, all children are "exceptional," but in different ways. Some **exceptional students** have remarkable abilities in math or music or art, for example. Others have disabilities that might impact their learning and require special services. Even though we will use various terms such as *developmental disabilities*, *communication disorders*, and *emotional disorders* throughout this cluster, a caution is in order: *Labeling students is a controversial issue.*

Exceptional students
Students who fall outside the typical range of development and require special educational services to reach their full potential.

A label does not tell which methods to use with individual students. For example, few specific "treatments" automatically follow from a "diagnosis" of behavioral disorder; many different teaching strategies and materials are appropriate. Further, the labels can become stigmas and self-fulfilling prophecies. Evidence indicates, for example, that high school teachers and counselors guide students labeled *learning disabled* into less-demanding courses than their actual abilities would warrant. The label itself seems to affect the guidance. Courses taken in high school are gateways to college and advanced education, so lower expectations for students—which lead to enrollment in less-demanding courses—can have a life-changing impact (D. Rice & Muller, 2013). Finally, labels are mistaken for explanations, as in "Santiago gets into fights because he has a behavior disorder." "How do you know he has a behavior disorder?" "Because he gets into fights" (Friend, 2018; Turnbull et al., 2020).

On the other hand, some educators argue that applying a label can protect the child. For example, if classmates know a student has a disability, they might be more willing to accept his or her behaviors and be supportive. Diagnostic labels still open doors to some programs, useful information, adaptive technology and equipment, or financial assistance. Labels probably both stigmatize *and* help students.

Impairments, Disabilities, and Handicaps

An **impairment** is any loss or abnormality in a physical or psychological structure or function. For example, a cataract is an impairment of the lens in your eye—the lens gets thick and cloudy. A **disability** is just what the word implies—an *inability* to do something specific such as see or walk. A cataract *impairment* can lead to a *disability* in seeing. A **handicap** is a *disadvantage* in certain situations. Some disabilities lead to handicaps but not in all contexts. For example, being blind (a visual disability) is a handicap if you want to drive a car but not when you are composing music or talking on the phone. Stephen Hawking, one of the greatest physicists of the 21st century, had amyotrophic lateral sclerosis (ALS) and lost the abilities to walk and talk. He once said he was lucky he became a theoretical physicist "because it is all in the mind. So my disability has not been a serious handicap." It is important we do not create *handicaps* for people by the way we react to their *disabilities*. Some educators have suggested that we drop the word *handicap* altogether because the source of the word is demeaning. One story suggests *handicap* came from the phrase "cap-in-hand," or seeking a favor. In earlier times many people with disabilities were forced to beg, cap-in-hand, just to survive (Hardman et al., 2017).

Impairment
A loss or abnormality in a physical or psychological structure or function.

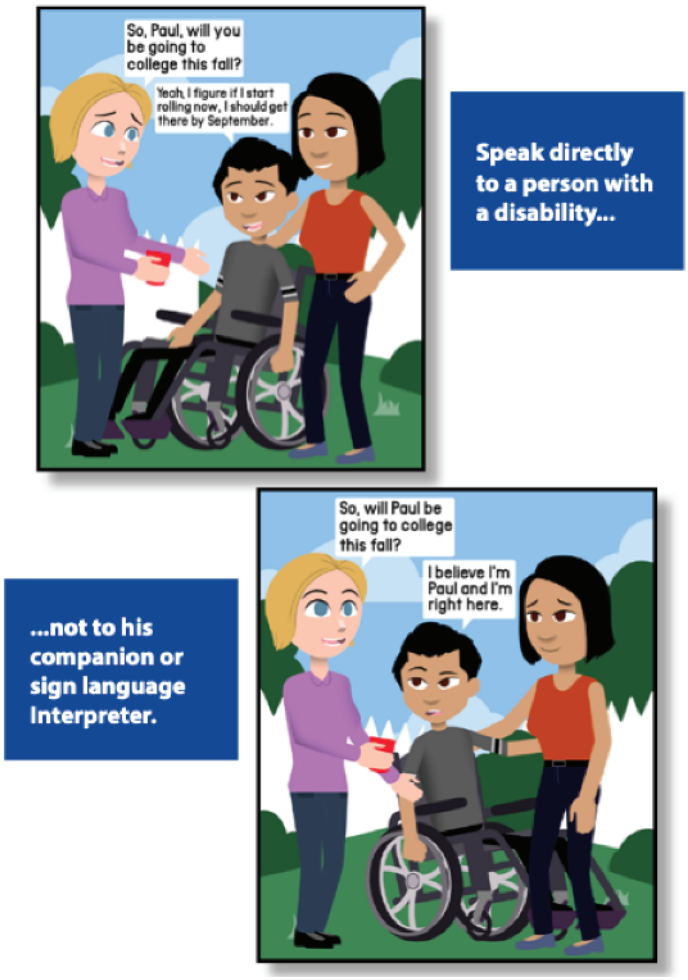
Disability
The inability to do something specific such as walk or hear.

Handicap
A disadvantage in a particular situation, sometimes caused by a disability.

We can think of all human characteristics as being on a continuum, for instance, from very acute hearing to complete deafness. We all fall somewhere on that continuum, and our position on the continuum changes over our lifetimes, as my husband will readily tell you about my hearing (Anita confessing this time)!

When speaking about a person with a disability, it is important that we avoid using the language of pity, as in "confined to a wheelchair" or "victim of AIDS." Wheelchairs are not confining. They allow people to get around. Using "victim of" or "suffering with"

Figure 5.1 Disability Etiquette



Source: Reprinted from "Disability Etiquette" © Permission granted by United Spinal Association. Go to https://www.unitedspinal.org/pdf/DisabilityEtiquette.pdf for a free download of the full publication. Illustrations by Aneil Rodriguez.

makes the person seem powerless. To learn more about the language of disability, every teacher should have the free booklet "Disability Etiquette" from the United Spinal Association. See Figure 5.1 on the next page for an example and the web link.

Another way to show respect for the dignity of individuals with disabilities is to use "person-first" language.

Person-First/Identity-First Language

You might have heard or even said terms like "emotionally disturbed student" or "at-risk student." Actually, the individual has many characteristics and abilities, and focusing on the disability misrepresents that individual. To respect the dignity and uniqueness of all students, an alternative is **person-first reference**: This language places the emphasis on the students first by speaking of "students with a behavior disorder" or "students placed at risk."

Person-first reference
Language that places the emphasis on the individual and not the disability by speaking of "an individual with a specific learning disability" or any other condition.

Students with disabilities	NOT	Disabled students
Students receiving special education	NOT	Special education students
A person with epilepsy	NOT	An epileptic
A child with a spinal cord injury	NOT	A crippled child
Children on the autism spectrum	NOT	Autistic children or autistics
Student with an intellectual disability	NOT	Mentally retarded

Be aware, however, that some people with disabilities prefer an **identity-first reference**. They believe that the disability is part of their identity; they "claim" the disability as their own and value it as a part of who they are. As the colleague of one psychologist said, "I am absolutely not a 'person with autism.' [The autism] is not detachable" (Dunn & Andrews, 2015, p. 257). As you will see later in the cluster, many people with hearing losses prefer to be called *deaf*—they are proud to be part of the deaf culture. The best advice for teachers probably is to use person-first language in writing but check with your students about how they like to be described in person. Best of all, use the students' names (Callahan, 2018; Turnbull et al., 2020).

Identity-first reference
Using terms such as "autistic" or "deaf" to describe an individual—some individuals prefer this reference because they "claim" the disability as their own and value it as a part of who they are. Having that disability and being part of that culture are sources of pride.

Possible Biases in the Application of Labels

Even though many good assessments and careful procedures are available to identify students with disabilities and to use labels properly, there is evidence that racial, ethnic, and language minority students are *overrepresented* in some disability categories. For example, Black students are three times as likely to be identified as having an intellectual disability compared to White students (Friend, 2018; U.S. Department of Education, 2016). But one large U.S. study that followed more than 20,000 students from kindergarten through eighth grade found an *underrepresentation* of racial, ethnic, and language minority students identified for special services in general. Are White parents more likely to seek help? Are professionals such as pediatricians or school psychologists more likely to recommend services for White, English-speaking children? Are parents of racial, ethnic, and language minority group students reluctant to add a label that they feel will stigmatize their children? Do they mistrust schools? Are English language learners underrepresented because they are not tested—because appropriate assessments are not available or not used? (Morgan et al., 2015)?

No matter the situation—overidentification in some categories and underidentification in others—two questions remain: Are racial, ethnic, and language minority students being well served by the schools? Are differences between the ways White students and minority group students are served the result of biases? Before making a formal referral, be sure to gather a range of information about a student such as the student's level of English proficiency and any unusual stressors such as being homeless. Having more knowledge about the student and his or her circumstances outside school should help teachers make better decisions about what programs are appropriate (Gonzalez et al., 1997; National Alliance of Black School Educators, 2002).

Speaking of labels, one that is often misunderstood in education is "intelligent."

Intelligence

Let's begin with a basic question:

What Does Intelligence Mean?

Stop & Think Who was the most intelligent person in your high school? Write down a name and the first four or five words that come to mind when you see that person in your mind's eye. What made you pick this individual?

The idea that people vary in what we call **intelligence** has been with us for a long time. Most early theories about the nature of intelligence involved one or more of the following three themes: (a) the capacity to learn, (b) the total knowledge a person has acquired, and (c) the ability to adapt successfully to new situations and to the environment in general. Notice how even these early definitions signal *that intelligence can be increased* because it includes the total knowledge you have acquired. A definition that captures these elements and stresses higher-order thinking states that intelligence is "the ability to reason deductively or inductively, think abstractly, use analogies, synthesize information, and apply it to new domains" (Kanazawa, 2010, p. 281).

Intelligence
Ability or abilities to acquire and use knowledge for solving problems and adapting to the world.

INTELLIGENCE: ONE ABILITY OR MANY? One of the best-established facts in the study of intelligence is the striking finding that scores on *all* cognitive tests are moderately to highly correlated (van der Mass et al., 2006). Because of these persistent intercorrelations, some psychologists believe intelligence is a basic ability that affects performance on all cognitively oriented tasks, from solving mathematical problems to analyzing poetry. Spearman (1927) believed this basic ability was *mental energy* and called it *g*. He also claimed that every cognitive task required *g* plus some task-specific abilities. We can mathematically compute a common factor (*g*) across cognitive tests, but this computed factor is simply a mathematical measure of **general intelligence**; it is not general intelligence itself. So, *the notion of* g *does not tell us what intelligence is or where it comes from* (Blair, 2006; Kanazawa, 2010).

General intelligence *(g)*
A general factor in cognitive ability that is related in varying degrees to performance on all mental tests.

Raymond Cattell and John Horn's theory of *fluid and crystallized intelligence* is more helpful in providing explanations of what intelligence is (Deary, 2012; Horn & McArdle, 2007; Kanazawa, 2010). **Fluid intelligence** is mental efficiency and the reasoning ability included in Kanazawa's definition of intelligence just quoted. The neurophysiological underpinnings of fluid intelligence may be related to changes in brain volume, myelination (the coating of neural fibers that makes processing faster), the density of dopamine receptors, or processing abilities in the prefrontal lobe of the brain such as selective attention and especially *working memory*, an aspect of brain functioning we will explore in Cluster 8 (Tourva et al., 2016; Waterhouse, 2006). This aspect of intelligence increases until late adolescence (about age 22) because it is grounded in brain development and then declines gradually with age. Fluid intelligence is sensitive to injuries and diseases of the brain and neurological system.

Fluid intelligence
Mental efficiency; nonverbal abilities grounded in brain development.

In contrast, **crystallized intelligence** is the ability to apply the problem-solving methods appropriate in your cultural context—the "application to new domains" part of Kanazawa's definition of intelligence. Crystallized intelligence can increase throughout the life span because it includes learned skills and knowledge such as reading, learning facts, and knowing how to use Uber, troubleshoot technology problems, make a quilt, or design a unit on symbolism in poetry. By *investing fluid intelligence* in solving problems, we *develop our crystallized intelligence*. Many tasks in life such as mathematical reasoning draw on fluid and crystallized intelligence working together (Ferrer & McArdle, 2004; Finkel et al., 2003).

Crystallized intelligence
Ability to apply culturally approved problem-solving methods.

The most widely accepted view today based on testing a wide range of mental abilities is that intelligence, like self-concept, has many facets and is a hierarchy of abilities, with general ability at the top and more specific abilities at lower levels of the hierarchy. John Carroll (2005) identifies one general ability on the top level, a few broad abilities under that on the second level (e.g., fluid and crystallized abilities, learning and memory, visual and auditory perception, retrieval ability, and cognitive processing speed), and at least 70 specific abilities such as language development, memory span, and simple reaction time on the third level. General ability may be related to the maturation and functioning of the frontal lobe of the brain, whereas specific abilities may be connected to other parts of the brain and to learning from experience (Anderson, 2020; Schalke et al., 2013).

Theory of multiple intelligences (MI)
In Gardner's theory of multiple intelligences, an individual has eight separate abilities: logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist.

Another View: Gardner's Multiple Intelligences

While Howard Gardner was a developmental psychologist doing research with two very different groups—students who were artistically gifted at Harvard's Project Zero and patients with brain injuries at Boston's Veterans Administration (VA) Medical Center—he started thinking about a new theory of intelligence. Time and time again at the VA Medical Center, Gardner observed patients with brain injuries who were lost spatially but could do all kinds of verbal tasks and other patients who had the opposite set of abilities and problems. He also worked with young children at Project Zero who could draw expertly but not craft a good sentence and vice versa. Gardner concluded that several separate mental abilities exist, and from this idea he developed his now-famous **theory of multiple intelligences (MI)** that describes at least eight separate intelligences (Gardner, 1983, 2003, 2009, 2011; Shearer, 2020). His dozens of books have been translated into 32 languages, and his ideas are very influential (NAEA, 2019).

Connect and Extend to PRAXIS II®

Multiple Intelligences (I, B1)

Many teachers erroneously assume that they must address each of the eight intelligences in each lesson they design. What are some of the realistic implications of the theory for classroom instruction?

WHAT ARE THESE INTELLIGENCES? The eight intelligences in MI theory are linguistic (verbal), musical, spatial, logical-mathematical, bodily-kinesthetic (movement), interpersonal (understanding others), intrapersonal (understanding self), and naturalist (observing and understanding natural and human-made patterns and systems). Gardner stresses that there may be more kinds of intelligence—eight is not a magic number. He has speculated that there might also be a spiritual intelligence and an existential intelligence—the abilities to contemplate big questions about the meaning of life (Gardner, 2009, 2011). As Gardner witnessed firsthand in his early research with veterans and students, individuals may excel in one of these eight areas but have no remarkable abilities, or they might even have problems in the other seven. Also, varying cultures and eras of history place different values on the eight intelligences. A naturalist intelligence is critical in farming cultures, whereas verbal and mathematical intelligences are important in technological cultures.

Table 5.1 summarizes these eight (or nine) intelligences.

CRITICS OF MULTIPLE INTELLIGENCES THEORY. Gardner's MI theory was met with "a chorus of critics from the educational psychology community along with a wave of enthusiasm from teachers around the world that continues to the present day" (Shearer, 2020, p. 49). Criticisms include that virtually no published studies validate MI theory (Waterhouse, 2006).

Table 5.1 Eight (or Nine) Intelligences

Howard Gardner's theory of multiple intelligences suggests that eight or nine kinds of human abilities exist. An individual might have strengths or weaknesses in one or several areas.

LOGICAL-MATHEMATICAL	**LINGUISTIC**
Skills:	Skills:
• Sensitivity to, and capacity to discern, logical or numerical patterns. • Ability to handle long chains of reasoning.	• Sensitivity to sounds, rhythms, and word meanings. • Sensitivity to different functions of language.
Example/Career Paths:	**Example/Career Paths:**
Scientist	Poet
Mathematician	Journalist
Engineer	Novelist
MUSICAL	**SPATIAL**
Skills:	Skills:
• Ability to appreciate and produce rhythm, tone, pitch, and timbre. • Appreciation of forms of musical expression.	• Ability to perceive the visual and spatial world accurately. • Ability to perform transformations on those perceptions.
Example/Career Paths:	**Example/Career Paths:**
Composer	Sculptor
Pianist	Navigator
Drummer	Architect
INTERPERSONAL	**INTRAPERSONAL**
Skills:	Skills:
• Ability to read the moods and motivations of others. • Ability to understand desires and needs of others and respond appropriately.	• Knowledge of your own strengths, weaknesses, capabilities, and needs and ability to use these to guide your behavior. • Access to your own feelings.
Example/Career Paths:	**Example:**
Therapist	Anyone with detailed, accurate knowledge of himself or herself
Salesperson	
Mediator	

(Continued)

Table 5.1 Eight (or Nine) Intelligences (Continued)

NATURALIST	**BODILY-KINESTHETIC**
Skills: • Ability to recognize plants and animals. • Ability to use categories and systems to understand the natural world.	Skills: • Ability to control body movements and know where your body is in space. • Ability to handle objects skillfully.
Example/Career Paths: Farmer Gardener Animal tracker	**Example/Career Paths:** Dancer/Actor Gymnast Carpenter
EXISTENTIAL	
Skills: • Ability to consider and examine deeper or larger questions about human existence and the meaning of life. • Ability to understand religious and spiritual ideas.	
Example/Career Paths: Philosopher Clergy Life coaches	

Source: Based on "Multiple Intelligences Go to School" by H. Gardner and T. Hatch (1989), *Educational Researcher, 18*(8), and "Are There Additional Intelligences? The Case for the Naturalist, Spiritual, and Existential Intelligences" by H. Gardner (1999) in J. Kane (Ed.), *Educational Information and Transformation*. Upper Saddle River, NJ: Prentice-Hall.

The eight intelligences are not independent; there are correlations among the abilities. In fact, logical-mathematical and spatial intelligences are highly correlated. Purely cognitive skills such as logical-mathematical, linguistic, and spatial abilities are closely related to and influenced by *g*, or general intelligence (Castejon et al., 2010; Sattler, 2020; Visser et al., 2006). Evidence linking musical and spatial abilities has prompted Gardner to consider that there may be connections among the intelligences (Gardner, 1998, 2003). So these "separate abilities" may not be so separate after all. In addition, some critics suggest that several intelligences are really talents (bodily-kinesthetic skill, musical ability) or personality traits (interpersonal ability). Other "intelligences" are not new at all. Many researchers have identified verbal and spatial abilities as elements of intelligence. Daniel Willingham (2004) has been even more blunt: "In the end, Gardner's theory is not that helpful. For scientists the theory is almost certainly incorrect. For educators, the daring applications forwarded by others in Gardner's name (and of which he disapproves) are unlikely to help students" (p. 24).

GARDNER RESPONDS. Gardner's supporters say he based his theory on a wide range of research in several fields including psychology, anthropology, biology, and neuroscience (Castejon et al., 2010). In fact, an extensive review of evidence from neuroscience suggests the different intelligences have their own neural architecture (Shearer, 2020). In addition, Gardner (2003, 2009) also has responded to critics by identifying several myths, misconceptions, and misuses related to MI theory and schooling. For example, he stresses that an intelligence is not the same as a sensory system: There is no "auditory intelligence" or "visual intelligence." Intelligences are not the same as learning styles. In fact, Gardner doesn't believe that people actually have consistent learning styles. Another misconception is that MI theory disproves the idea of general intelligence. Gardner does not deny the existence of a general ability, but he does question how useful general intelligence is as an explanation for human achievements. As to misuses, Gardner particularly deplored an educational project in Australia that claimed different ethnic groups had certain specific intelligences but lacked others. Gardner went on television in Australia to call this program what it really was—"pseudoscience" and "veiled racism" (Gardner, 2009, p. 7). The project was canceled. Another misuse is that some teachers embrace a simplistic version of Gardner's theory by including every "intelligence" in every lesson, no matter how inappropriate.

Multiple Intelligences: Lessons for Teachers

After years of work on his MI theory, Gardner believes two lessons are most important (2009). First, teachers should take the individual differences among students seriously and differentiate their instruction to connect with each student. The language of MI sends a powerful message to students and their families that every brain is unique and a complex collection of strengths and limitations. Teachers can promote students' strengths and use these strengths to manage limitations. They can also remember that emotions are part of, not barriers to, learning (Shearer, 2020). Much of this book will help you do just that. Second, any discipline, skill, or concept should be taught in several appropriate ways (but not eight ways every time). Anything worth knowing has different representations and multiple connections to various ways of thinking. And understandings can be expressed in words, images, movements, tables, charts, numbers, equations, poetry, and on and on. Gardner and his colleagues have developed many good uses of MI theory—see https://www.thegoodproject.org. The MI theory expands our thinking about abilities and avenues for teaching, but learning is still hard work, even if there are multiple paths to knowledge.

Another View: Sternberg's Successful Intelligence

Robert Sternberg's **triarchic theory of successful intelligence** is a cognitive processing approach to understanding intelligence that focuses on the skills needed to be successful (Sternberg, 1985, 2004, 2018; Sternberg, 2020). Sternberg uses the term *successful intelligence* to stress that intelligence is more than what is tested by cognitive abilities measures: Intelligence involves setting and achieving personal goals based on your own definition of success in your particular cultural context. You have to capitalize on your strengths and compensate for your weaknesses by selecting tasks and situations (environments) that allow you to be successful and then by adapting to or shaping the environment as needed.

Triarchic theory of successful intelligence
A three-part description of the mental abilities (thinking processes, coping with new experiences, and adapting to context) that lead to more or less intelligent behavior.

Successful intelligence requires three skills or ways of thinking: analytic, creative, and practical. *Analytic skills* involve evaluating, analyzing, judging, comparing, and contrasting to deal with relatively familiar problems. This is the kind of thinking most often taught in school and measured on traditional intelligence tests. *Creative skills* are necessary to cope successfully with new experiences in two ways: (a) using **insight**, or the ability to deal effectively with novel situations and find new solutions, and (b) using **automaticity**, the ability to become efficient and automatic in thinking and problem solving—to quickly make the new solutions part of your cognitive tool kit, so to speak. *Practical skills* focus on choosing an environment in which you can succeed, adapting to that environment, and reshaping it if necessary. Intelligence in this third sense involves practical matters such as career choice and social skills. And clearly, practical intelligence will depend on the culture—what makes for success in a fishing village in Alaska is not the same as the practical intelligence necessary to thrive in large city in China or India (Sternberg, 2018).

Insight
In the triarchic theory of intelligence, the ability to deal effectively with novel situations.

Automaticity
The ability to thoroughly perform learned tasks without much mental effort. The result of learning to perform a behavior or thinking process so thoroughly that the performance is automatic and does not require effort.

How might teachers use Sternberg's theory to guide instruction and assessment? In a podcast Sternberg gives these examples (Sternberg, 2014).

Teaching About World War II

- *Analytic:* Analyze and explain the causes of WWII.
- *Creative:* Imagine and describe what would be different today if Germany had won the war.
- *Practical:* Determine what the events of WWII tell us about how to deal with current world crises, particularly genocides and the rise of autocratic leaders.

Assessment in Language Arts

- *Analytic:* Compare and contrast the writing styles of Hemingway and Fitzgerald.
- *Creative:* Write a different ending for *The Adventures of Tom Sawyer*.
- *Practical:* Determine what you can learn from *The Adventures of Tom Sawyer* about persuasion based on the way Tom got his friends to whitewash his fence.

Neuroscience and Intelligence

As you can see, the theories of Spearman, Cattell and Horn, Carroll, Gardner, and Sternberg tend to describe how individuals differ in the *content* of intelligence—different abilities. In contrast, work in cognitive psychology has emphasized the *information processing* that is common to all people. How do humans gather and use information to solve problems and behave intelligently? Information processing explanations of intelligence emphasize working memory capacity, the abilities to focus attention and inhibit impulses, and emotional self-regulation as aspects of fluid cognitive abilities. In a study that examined working memory, attention, and speed of information processing, only *working memory* significantly predicted fluid, crystallized, and general intelligence as measured by a common test of adult intelligence (Tourva et al., 2016). It appears that the decline of intelligence with aging is mostly associated with decreases in working memory (Anderson, 2020). We explore working memory and other aspects of information processing in Cluster 8, so stay tuned.

As you recall, a major feature of the human brain is *plasticity*, changes in neural connections as a result of interactions with the environment. Some neuroscience researchers contend that individual differences in general intelligence are due to differences in neural plasticity—some brains are better than others at forming connections in response to experience. Neural connections develop over childhood to allow for better processing of more and more complex information. Developments in these neural connections that underlie fluid intelligence peak around age 16. So the school years are critical times for developing intellectual abilities (Garlick, 2002). Learning and the development of crystalized intelligence continue throughout life, but experiences in school are particularly important for the growth of fluid abilities. As a teacher, you need to take advantage of the plasticity of your students' brains—they are developing their intelligence every day.

Even though there are many theories of intelligence, teachers, students, and parents are most familiar with intelligence as a number or score on an intelligence quotient (IQ) test.

Measuring Intelligence

In spite of psychologists' debates about what intelligence is, they do agree that intelligence, as measured by standardized tests, is related to learning in school. Why is this so? It has to do in part with the way intelligence tests were first developed in Paris.

BINET'S DILEMMA. In 1904, Alfred Binet was confronted with the following problem by the French Ministry of Education: How can students who will need special instruction and extra help be identified early in their school careers, before they fail in general education classes? Binet also believed that having an objective measure of learning ability could protect low-income students from being forced to leave school because they were the victims of discrimination and assumed to be slow learners.

Mental age
In intelligence testing, a performance that represents average abilities for an age group.

Intelligence quotient (IQ)
Score comparing mental and chronological ages.

After trying many possibilities, Binet and his collaborator, Theodore Simon, finally identified 58 tests, several for each age group from 3 to 13, that measured *the underlying abilities necessary to succeed in school*, such as problem solving; understanding language; memory for objects, numbers, or sentences; spatial reasoning; and so on. Binet's tests allowed the examiner to determine a **mental age** for a child. A child who succeeded on the items passed by most 6-year-olds, for example, was considered to have a mental age of 6, whether the child was actually 4, 5, 6, 7, or 8 years old. The concept of **intelligence quotient (IQ)** was added after Binet's test was brought to the United States and revised at Stanford University to give us the Stanford-Binet test. An IQ score was computed by comparing the mental-age score to the individual's chronological age. The formula was:

$$\text{Intelligence Quotient} = \text{Mental Age}/\text{Chronological Age} \times 100$$

So, if a child's measured mental age were exactly the same as her or his chronological age, then MA/CA would equal 1, and the result would be IQ = 1 × 100 = 100, or average. Today we don't use mental age but instead compute a **deviation IQ**—a number that indicates exactly how much a person's score is above or below the mean for her or his age group.

Deviation IQ
Score based on a statistical comparison of an individual's performance with the average performance of others in that age group.

The early Stanford-Binet test has been revised five times and now assesses general intelligence and five specific factors: working memory, fluid reasoning, knowledge, visual-spatial processing, and quantitative reasoning (Roid, 2003). This version is consistent with Carroll's (2005) hierarchical model, which has one general ability and several other broad abilities.

Put Yourself in Their Place You are a 9-year-old student being assessed by the school psychologist. She asks you, "How are an inch and a mile alike?" "What does *obstreperous* mean?" "Repeat these numbers backward: 8 5 7 3 0 2 1 9 7." "Here is a completed puzzle. Which three pieces from these possibilities go together to make this puzzle?"

These items are similar to the questions from the most widely used individual intelligence test, the *Wechsler Intelligence Scale for Children* or *WISC-V* (Wechsler, 2014). Other parts of the test ask the child to copy a design using blocks, do math problems mentally (without paper and pencil), pick out one item from each row of objects to form a group that "goes together," or, using only pictures, select items to balance a scale. The WISC-V assesses general intelligence as well as working memory, processing speed, verbal comprehension, visual-spatial reasoning, and fluid reasoning—also consistent with Carroll's model.

WHAT DOES AN IQ SCORE MEAN? Most intelligence tests such as the Stanford-Binet and the WISC-V are designed so that they have certain statistical characteristics. For example, the average score is 100: 50% of the people from the general population who take the tests will score 100 or below, and 50% will score above 100. About 68% of the general population will earn IQ scores between 85 and 115. Only about 16% will receive scores below 85, and only 16% will score above 115. Note, however, that these figures hold true for White, native-born Americans whose first language is Standard English. Whether IQ tests should even be used with ethnic minority-group students is hotly debated.

Connect and Extend to PRAXIS II®
Intelligence Testing (II, C1, 4)
The public often misunderstands intelligence testing. Be prepared to respond to questions about the appropriate uses of intelligence tests. What are some inappropriate uses of these tests?

GROUP VERSUS INDIVIDUAL IQ TESTS. The Stanford-Binet and the WISC-V are individual intelligence tests. They have to be administered to one student at a time by a trained psychologist and take about 1 to 2 hours. Most of the questions are asked orally and do not require reading or writing. A student usually pays closer attention and is more motivated to do well when working directly with an adult.

Psychologists also have developed group tests that can be given to entire classes or schools. Compared to an individual test, a group test is much less likely to yield an accurate picture of any one person's abilities (Sattler, 2020). When students take tests in a group, they may do poorly for many reasons: They do not understand the instructions, they have trouble reading, their pencils break or they lose their place on the answer sheet, other students distract them, or the answer format confuses them. As a teacher, you should be *very wary* of IQ scores based on group tests. The *Guidelines: Interpreting IQ Scores* on the next page will help you interpret IQ scores realistically.

THE FLYNN EFFECT: ARE WE GETTING SMARTER? Ever since IQ tests were introduced in the early 1900s, scores in 30 different industrialized countries and some developing ones have increased. In fact, in a decade the average score goes up about 3 points on standardized IQ tests in the most industrialized countries and as much as 6 points or more in countries that have modernized recently. This increase is called the **Flynn effect** after James Flynn, a

Flynn effect
Because of better health, smaller families, increased complexity in the environment, and more and better schooling, IQ test scores are steadily rising.

GUIDELINES

Interpreting IQ Scores

Check to see whether the score is based on an individual or a group test. Be wary of group test scores.

Examples

1. Individual tests include the Wechsler Scales (WPPSI–IV, WISC-V, WAIS-IV); the Stanford-Binet (5th edition); the Woodcock-Johnson IV; the Naglieri Nonverbal Ability Test—Individual; the Kaufman Assessment Battery for Children (2nd edition); and the Wide Range Intelligence Test.
2. Group tests include the Otis-Lennon School Abilities Tests (8th edition), the Slosson Intelligence Test (4th edition), the Raven Progressive Matrices, the Naglieri Nonverbal Ability Test (3rd edition), and the Differential Abilities Scales II.

Remember that IQ tests are only estimates of general aptitude for learning.

Examples

1. Ignore small differences in scores among students.
2. Bear in mind that even an individual student's scores may change over time for many reasons, including development of new abilities or measurement error.
3. Be aware that a total score is usually an average of scores on several kinds of questions. A score in the middle or average range might mean that the student performed at the average level on every kind of question or that the student did quite well in some areas (e.g., on verbal tasks) and rather poorly in other areas (e.g., on spatial tasks).

Remember that IQ scores reflect a student's past experiences and learning.

Examples

1. Consider these scores to be predictors of school abilities, not measures of innate intellectual abilities.
2. If a student is doing well in your class, do not change your opinion or lower your expectations just because one score seems low—many reasons for low scores exist.
3. Be wary of IQ scores for minority students and for students whose first language is not English. Even scores on "culture-free" tests are lower for students placed at risk.

political scientist who documented the phenomenon (Berk, 2019; Nisbett et al., 2012). So are you smarter than your parents? James Flynn (2012) answers this way:

> If you mean "Do our brains have more potential at conception than those of our ancestors?" then we are not. If you mean "Are we developing mental abilities that allow us to better deal with the complexity of the modern world, including problems of economic development?" then we are. (p. 1)

Some explanations for the Flynn effect include better nutrition and medical care for children and parents, increasing complexity in the environment that stimulates abstract thinking, smaller families who give more attention to their children, increased literacy of parents (particularly better educated mothers), more and better schooling, and better preparation for taking tests. Lately, there has been a slight decrease in IQ scores, but not enough to change to overall trend.

INTELLIGENCE AND ACHIEVEMENT. Scoring higher on IQ tests is related to academic achievement for children in all ethnic groups (Cucina et al., 2016; Ritchie, 2016). This shouldn't be too surprising because Binet designed the first IQ test to *predict* school achievement, and it worked. Researchers following 14,000 British children in the *Avon Longitudinal Study of Parents and Children* found a clear relationship ($r = .64$) between measured IQ at age 8 and achievement on standardized tests in math, English, and science at age 14. But beware of overinterpreting this relationship. Statistically, this correlation means that IQ explains less

than 41% of the variation in achievement among the students. Almost 60% is related to other factors (Bornstein et al., 2013).

The relationship between IQ scores and school achievement is interesting, but standard IQ tests measure only *analytic* skills, not *practical* or *creative* thinking or motivation. Angela Duckworth and her colleagues (2012) found that IQ scores predict standardized test scores, but measures of self-regulation (see Cluster 11) are better predictors of grades in school. So IQ test scores are related to some kinds of academic achievement, but when measures of self-regulated learning skills, practical intelligence, and creativity are included, we can make even better predictions of school success (Grigorenko et al., 2009).

But what about life after school? Do people who score high on IQ tests achieve more in life? Here the answer is less clear because life success and education are intertwined: People with higher intelligence test scores tend to complete more years of school. High school graduates earn about $746 per week and have a 3.7% unemployment rate. College graduates earn about $1,248 per week, with a 2.2% unemployment rate, and people with professional degrees such as in law or medicine earn around $1,861 per week, with a 1.6% unemployment rate (Bureau of Labor Statistics, 2020). However, when the number of years of education is held constant, the correlation decreases between IQ scores and income or success in later life. Other factors such as self-regulation, motivation, creativity, common sense, social skills, luck, and even emotional intelligence (discussed later) may have a greater effect on life achievement (Alarcon & Edwards, 2013; Duckworth et al., 2012; Neisser et al., 1996). Several meta-analyses show that IQ accounts for no more than 25%, and often much less, of the variance in life success outcomes (Cherniss et al., 2006).

Sex Differences in Intelligence and Achievement

From infancy through the preschool years, most studies find few differences between boys and girls in overall mental development. The average IQ scores for boys and girls are basically the same. But during the school years and beyond, scores on some tests of specific abilities do show sex differences. Women in general excel in verbal ability tests, speech production, and writing; memory for words, objects, and locations; some perceptual motor skills; and associational fluency. Large sex differences favor men on tests of mental rotation. In terms of quantitative abilities there are few sex differences, except that more boys than girls score at the highest levels on standardized tests of mathematics for college admission, such as the SAT. Girls are overrepresented at the high-ability end on writing tests and (to a lesser extent) on tests of verbal reasoning (Halpern, 2012; Lewno-Dumdie & Hajovsky, 2020). There are several cautions, however. The number of areas where researchers have found sex differences is very small. Also, in most studies, race and ethnicity are not taken into account. As you learned in Cluster 2, people are much more complex than any single category indicates. Examining gender as a binary variable can also be problematic (Hyde et al., 2019).

Several recent international assessments have found some sex differences in *academic achievement* (not specific intellectual abilities). For example, the results of the 2018 international PISA tests of 15-year-olds showed that girls significantly outperformed boys by almost 30 points on average in reading in all 79 countries and economies tested. The U.S. gap of 24 points seems large, but in Finland, girls outperformed boys by more than 50 points. The educational opportunities in different locations probably play a role. For example, in rural Indonesia, girls outperformed boys in math and reading based on access to higher-quality preschools (Nakajima et al., 2020). In mathematics, boys outperformed girls on average by 5 points, but girls scored higher in math than boys in 14 countries/economies such as Iceland, Sweden, Israel, and Saudi Arabia, whereas boys' scores were higher in countries such as Austria, Italy, and Japan. In science, girls performed slightly better than boys but only by 2 points on average.

The National Assessment of Educational Progress (NAEP) added an assessment of Technology and Engineering Literacy to its battery of tests in 2014. That year, eighth-grade

girls in the United States outperformed boys by 3 points. In 2018 they outperformed boys by 5 points—both differences are statistically significant (NAEP, 2018). Armed with such information from the NAEP assessments and the results of international tests, parents, teachers, guidance counselors, and students can challenge the stereotypes about female inferiority in math and technology.

HEREDITY OR ENVIRONMENT? The study of intelligence has been the setting for the most passionate debates about nature versus nurture. Should intelligence be seen as a potential that is limited by our genetic makeup? Or does intelligence simply refer to an individual's current level of intellectual functioning, as influenced by experience and education?

Beware of either/or comparisons: It is impossible to separate intelligence "in the genes" from intelligence "due to experience." For one reason, different genes may increase the chances that we select or reject different experiences—our nature selects our own nurture. Also, different environmental conditions can affect how genes are expressed. Today, most psychologists believe that differences in intelligence are the result of both heredity and environment, probably in about equal proportions for children (Plomin, 2018; Plomin & von Stumm, 2018). And environmental influences include everything from the health of a child's mother during pregnancy to the amount of lead in the child's home to the quality of teaching a child receives. The large differences among countries on the PISA tests show how important education can be.

Learning to Be Intelligent: Being Smart About IQ

We saw that intelligence tests originally were developed, in part, to protect the rights of low-income children who might have been denied an education on the false grounds that they weren't able to learn. Even so, these tests can never be free of cultural content, so they always will have some biases built in. Keep this in mind when you see your students' scores on any test. Finally, remember that the results of every assessment for every student should be used to support that student's learning and development and to identify effective practices, not to deny the student access to resources or appropriate teaching. For all adults caring for children—parents, teachers, administrators, counselors, medical workers—it is especially important to realize that cognitive skills, like any other skills, can always be improved. *Intelligence is a current state of affairs, affected by past experiences and open to future changes.* Remember, brain plasticity throughout childhood and adolescence makes the school years especially important for developing intellectual skills (Garlick, 2002).

Emotional Intelligence

You might have noticed that the conceptions and measurements of intelligence we just examined are quite rational and analytic—you could call them "cold cognition." But intelligent actions and success in life also involve emotions—recognizing emotions in yourself and others as well as reasoning with and about emotions to guide decisions and achieve goals (Yale Center for Emotional Intelligence, 2021). Certainly, Gardner's theory of multiple intelligences includes some aspects of **emotional intelligence**: interpersonal and intrapersonal intelligences. And emotional intelligence could be one aspect of Sternberg's practical intelligence. People who can understand and manage the emotions of themselves and others are more successful in school, work, and life in general (Cherniss et al., 2006). Mary Helen Immordino-Yang and her colleagues (2019) assert that the connections between emotions and intelligence are at the basic level of brain development. "New advances in neurobiology are revealing that brain development and the learning it enables are directly dependent on social-emotional experience" (p. 186). Social interactions and emotional experiences are the triggers that organize and teach the brain. Brain development and learning flourish when students have engaging intellectual challenges, supportive social relationships, and healthy physical and

Emotional Intelligence (EI)
The abilities to monitor your own and other people's feelings, to discriminate among different feelings, and to use this information to guide your own thinking, decisions, and actions.

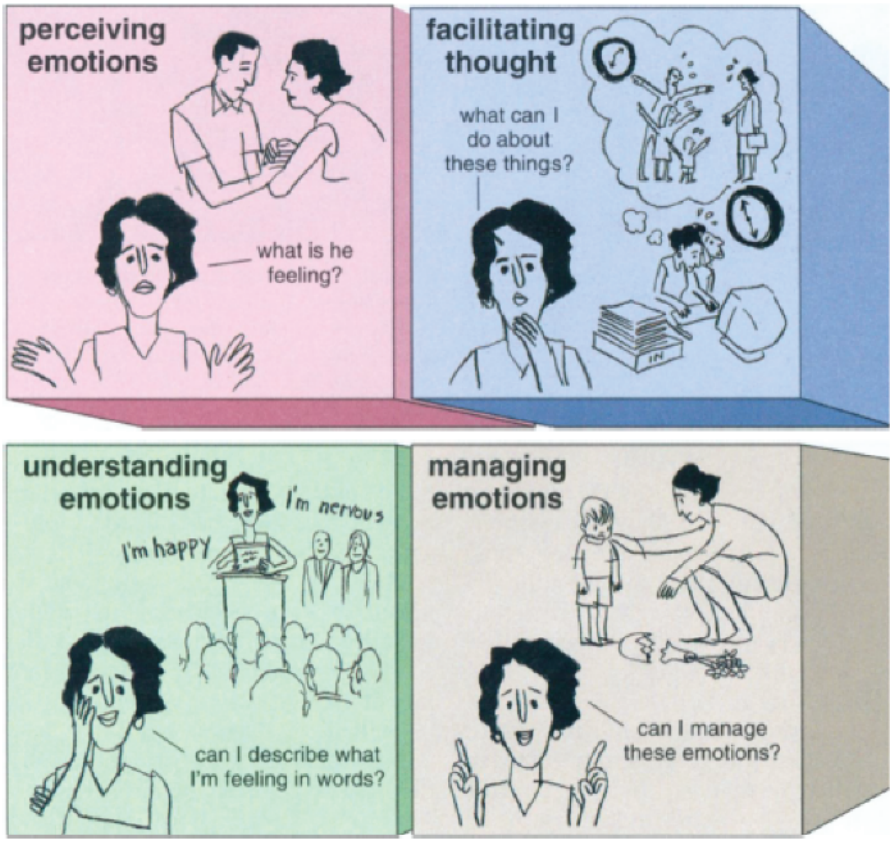
emotional environments. So basic brain development points to the importance of teaching the whole child and social and emotional learning (SEL). What is emotional intelligence, and why does it matter?

WHAT IS EMOTIONAL INTELLIGENCE? In 1995, Daniel Goleman published *Emotional Intelligence: Why It Can Matter More Than IQ*. It was an instant success, as confirmed by the October 2, 1995, *Time Magazine* cover story "What Is Your EQ?" Actually, the originators of the emotional intelligence concept were Peter Salovey and John Mayer at Yale University. They developed the idea while painting a room in Salovey's house in 1987 and lamenting that theories of intelligence overlooked emotions. Three years later they published an article introducing the concept (Salovey & Mayer, 1990; Yale Center for Emotional Intelligence, 2021). You may have heard emotional intelligence referred to as EQ, but the preferred abbreviation is EI.

Salovey and Mayer developed a four-part model of emotional intelligence, shown in Figure 5.2. This ability is different from social skills, character, motivation, optimism, "people skills," and personality traits. It is labeled an "intelligence" because being able to perceive, understand, think with, and manage emotions helps people learn and adapt—two characteristics of intelligence (Cherniss et al., 2006; Grewal & Salovey, 2005; MacCann et al., 2020).

Figure 5.2 Four Domains of Skills Make Up Emotional Intelligence

Each domain includes many skills. For example, "perceiving emotions" can mean identifying emotions in voices, facial expressions, music, pictures, sounds, and so on. "Understanding emotions" can involve discriminating between related emotions such as frustration and anger or being able to name emotions with appropriate words.



Source: Grewal, D., & Salovey, P. (2005). Feeling smart: The science of emotional intelligence: A new idea in psychology has matured and shows promise of explaining how attending to emotions can help us in everyday life. *American Scientist, 93,* 334.

The research on emotional intelligence has connected the abilities in Figure 5.2 to valuable outcomes in school, work, and social relations. For example, Carolyn MacCann and her colleagues (2020) examined 188 samples from 27 different countries that related emotional intelligence to school achievement in elementary school, high school, and college. Results indicated that emotional intelligence, particularly the ability to understand and manage emotions, was moderately related to academic achievement—grades and achievement test scores. General intelligence was a stronger predictor of achievement, but emotional intelligence was related as well. Remember, correlation is not causation, but it seems that developing emotional intelligence in schools will not harm academic achievement and might actually help.

The concern for social and emotional learning in schools, described in Clusters 1 and several other clusters, is one consequence of the interest in emotional intelligence. The Yale Center for Emotional Intelligence is a good source of information on SEL programs grounded in emotional intelligence (https://www.ycei.org/emotions-at-school-and-work). You should be aware, however, that the center has been criticized by prominent SEL researchers for overlooking social justice issues and the educational needs of Black and Indigenous people of color (Simmons, 2019, 2021; Young, 2021). Dena Simmons, a prominent leader in SEL, resigned from the Yale Center in 2021 and has founded her own school-based approach to SEL called LiberatED.

You saw earlier that some explanations of intelligence include creativity—let's take a deeper look.

Module 15 Summary

Language and Labeling (pp. 187–189)

What are the advantages of and problems with labels? Labels and diagnostic classifications can easily become both stigmas and self-fulfilling prophecies, but they can also open doors to special programs and help teachers develop appropriate instructional strategies.

What is person-first language? Person-first language ("students with intellectual disabilities," "students placed at risk," etc.) is an alternative to labels that describe a complex person with one or two words, implying that the condition labeled is the most important aspect of the person. Identity-first language is preferred by some individuals, including members of the deaf community.

Distinguish among an impairment, a disability, and a handicap. An impairment is any loss or abnormality in a physical or psychological structure or function—for example, a cataract. A disability is an inability to do something specific such as see or walk. A handicap is a disadvantage in certain situations. Some disabilities lead to handicaps but not in all contexts. Teachers must avoid imposing handicaps on learners with disabilities.

Intelligence (pp. 189–200)

What is *g*? Spearman suggested that there is one mental attribute, which he called *g*, or general intelligence, that is used to perform any cognitive test but that each test also requires some specific abilities in addition to *g*. A current version of the general plus specific abilities theory is Carroll's work identifying a few broad abilities (e.g., learning and memory, visual perception, verbal fluency) and at least 70 specific abilities. Fluid and crystallized intelligences are two of the broad abilities identified in most research.

What is Gardner's view of intelligence and his position on *g*? Gardner contends that there are several separate intelligences: linguistic, musical, spatial, logical-mathematical, bodily-kinesthetic, interpersonal, intrapersonal, naturalist, and perhaps existential. Gardner does not deny the existence of *g*, but he questions how useful *g* is as an explanation for human achievements.

What are the elements in Sternberg's theory of intelligence? Successful intelligence requires three skills or ways of thinking: analytic, creative, and practical. *Analytic skills* involve evaluating,

analyzing, judging, comparing, and contrasting to deal with relatively familiar problems. *Creative/experiential* intelligence involves coping with new experiences through insight and automaticity. *Practical/contextual* intelligence involves choosing to live and work in a context where success is likely, adapting to that context, and reshaping it if necessary. Practical intelligence is made up mostly of action-oriented, tacit knowledge learned during everyday life.

How is intelligence measured, and what does an IQ score mean? Intelligence is measured through individual tests (Stanford-Binet, Wechsler, etc.) and group tests (Otis-Lennon School Abilities Tests, Slosson Intelligence Test, Raven Progressive Matrices, Naglieri Nonverbal Ability Test—Multiform, Differential Abilities Scales, Wide Range Intelligence Test, etc.). Compared to an individual test, a group test is much less likely to yield an accurate picture of any one individual's abilities. The average score is 100. About 68% of the general population will earn IQ scores between 85 and 115. Only about 16% of the population will earn scores below 85, and another 16% will earn scores above 115. These figures hold true for White, native-born Americans whose first language is Standard English. Intelligence tests predict success in school but are less predictive of success in life when level of education is taken into account.

What is the Flynn effect, and what are its implications? Since the early 1900s, IQ scores have been rising. Some explanations include better nutrition and medical care for children and parents, increasing complexity in the environment that stimulates abstract thinking, smaller families who give more attention to their children, increased literacy of parents (particularly better-educated mothers), more and better schooling, and better preparation for taking tests.

Are there sex differences in cognitive abilities? Women seem to be better on verbal tests, especially when writing is involved. Men seem to be superior on tasks that require mental rotation of objects. The scores of men tend to be more variable in general, so more men than women have very high or very low scores on tests. There are two cautions, however: These sex differences generally are small. Also, in most studies, race and ethnicity are not taken into account.

MODULE 16 Creativity and Learning Styles

Learning Objective 5.3 Explain how creativity is defined, assessed, and encouraged in the classroom.

Learning Objective 5.4 Discuss the problems with the measurement and application of learning styles and the appropriate uses of students' learning preferences.

Creativity: What It Is and Why It Matters

Put Yourself in His Place Consider this student: He has dyslexia—a specific learning disability that makes reading and writing exceedingly difficult. He describes himself as an "underdog." In school, he knows that if the reading assignment would take others an hour, he has to allow 2 to 3 hours. He knows that he has to keep a list of all of his most frequently misspelled words to be able to write at all. He spends hours alone in his room. Would you expect his writing to be creative? Why or why not?

The person described in this *Put Yourself in His Place* is John Irving, celebrated author of what one critic called "wildly inventive" novels such as *The World According to Garp, The Cider House Rules*, and *A Prayer for Owen Meany* (Amabile, 2001). How do we explain his amazing creativity? What is creativity?

Generally, **creativity** is the ability to generate new ideas that fit the situation and are effective. Most definitions of creativity include these two elements: novelty/originality and high quality/effectiveness/usefulness (Frith et al., 2020; Henriksen & Mishra, 2015). There is no such thing as "all-purpose creativity"; people are creative in a particular area, as John Irving was in writing fiction. To be creative in a particular domain requires a deep

Creativity
Imaginative, original thinking or problem solving.

understanding of the subject, so we can view creativity as a process that uses existing knowledge and also improvises and invents to produce something new (Glăveanu et al., 2020; Sawyer, 2015). A Teacher of the Year said it this way: "Creativity means to use your background knowledge.... Taking something that already exists and putting your own spin on it" (Henriksen & Mishra, 2015, p. 10). Also, to be creative, the "invention" must be intended. An accidental spilling of paint that produces a novel design is not creative unless the artist recognizes the potential of the "accident" or uses the spilling technique intentionally to create new works. Although we frequently associate the arts with creativity, any subject can be approached in a creative manner. The Teacher of the Year stressed that *creativity can be learned*. Creativity is a habit of mind that involves nurturing enthusiasm and being open to new ideas. In addition, today creativity often is collaborative, not so much the trait of one individual but more a collective accomplishment of a connected community (Grigorenko, 2019).

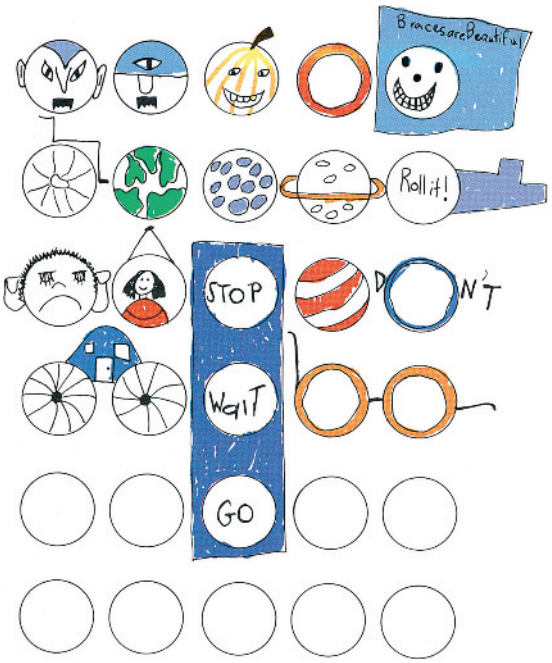
Assessing Creativity

Stop & Think How many uses can you list for a brick? Take a moment and brainstorm—write down as many as you can.

Like author John Irving, Paul Torrance had a learning disability. He became interested in educational psychology when he was a high school English teacher (Neumeister & Cramond, 2004). Torrance was known as the "Father of Creativity." He developed two types of creativity tests: verbal and graphic (Torrance, 1972, 2008; Torrance & Safter, 1986). In the verbal test, you might be instructed to think up as many uses as possible for a brick (as you did in the *Stop & Think* question) or asked how a particular toy might be changed to make it more fun. On the graphic test, you might be given 30 circles and asked to create 30 different drawings, each drawing including at least one circle. Figure 5.3 shows the creativity of an 8-year-old girl in completing this task.

Figure 5.3 A Graphic Assessment of the Creativity of an 8-Year-Old

The titles she gave her drawings, from left to right in each row, are as follows: "Dracula," "one-eyed monster," "pumpkin," "Hula-Hoop," "poster," "wheelchair," "earth," "moon," "planet," "movie camera," "sad face," "picture," "stoplight," "beach ball," "the letter O," "car," "glasses."



Source: "A Graphic Assessment of the Creativity of an Eight-Year-Old," from *The Torrance Test of Creative Thinking* by E. P. Torrance, 1986, 2000. Reprinted with permission of Scholastic Testing Service, Inc., Bensenville, IL 60106 USA.

These creativity tests require divergent thinking, an important component of many conceptions of creativity. **Divergent thinking** is the ability to propose many different ideas or answers. **Convergent thinking** is the more common ability to identify only one answer. Divergent thinking has three aspects: originality, fluency, and flexibility. *Originality* is usually determined statistically. To be original, a response must be given by fewer than 5 or 10 people out of every 100 who take the test. *Fluency* is the sheer number of different responses. *Flexibility* is generally measured by the number of different categories of responses. For instance, if you listed 20 uses of a brick but each was to build something, your fluency score might be high (high number of uses), but your flexibility score would be low (just one category of use). Of the three measures, fluency—the sheer number of responses—is the best predictor of divergent thinking, but there is more to real-life creativity than divergent thinking (Plucker et al., 2004).

Divergent thinking
Coming up with many possible solutions.

Convergent thinking
Narrowing possibilities to a single answer.

A few possible indicators of creativity in your students are curiosity, concentration, adaptability, high energy, humor (sometimes bizarre), independence, playfulness, risk taking, attraction to the complex and mysterious, seeing different perspectives, nonconformity, willingness to fantasize and daydream, intolerance for boredom, and inventiveness (Sattler & Hoge, 2006; Sawyer, 2015).

OK, But So What: Why Does Creativity Matter?

I (Anita throughout this cluster) cannot read any news these days without feeling depressed about the problems facing the world. Economic problems, health problems, pandemic problems, energy problems, political problems, climate change, violence, poverty, civil and religious wars, the list goes on. Certainly, today's and tomorrow's complex problems will require creative solutions. "Creativity is one of the most important skills needed in the 21st century" (Sawyer, 2015, p. 2). And creativity is important for an individual's psychological, physical, social, and career success (Grigorenko, 2019). In addition, evidence shows that creativity and critical thinking are needed to prevent people or societies from being trapped by ideology and dogma (Ambrose & Sternberg, 2012; Plucker et al., 2004). Alene Starko (2014) described her visit to China, where educators all over that country kept asking her how to help their students become more creative, flexible thinkers. These Chinese students knock the top off of the international tests, but their focus on mastering academics comes at a cost to their creativity and critical thinking. In the United States, many teachers will tell you that the pressures of accountability and preparing their students for high-stakes tests have forced creative teaching and teaching for student creativity out of the classroom (Noddings, 2013).

But we don't have to choose between understanding and creativity. Strategies that support creativity also support deep understanding in school subjects because deep understanding comes from using the content in multiple ways and seeing different implications of that knowledge—"putting your own spin on it." Creativity also supports intrinsic motivation, engagement, and persistence in learning because creativity generates novelty and sparks interest (Starko, 2014).

What Are the Sources of Creativity?

Teresa Amabile (1996, 2001) proposed a three-component model of creativity. Individuals or groups must have:

1. *Domain-relevant skills* including talents and competencies that are valuable for working in the domain, such as Michelangelo's skills in shaping stone, developed when he lived with a stonecutter's family as a child.
2. *Creativity-relevant processes* including work habits and personality traits such as John Irving's habit of working 10-hour days to write and rewrite and rewrite until he perfected his stories.
3. *Intrinsic task motivation* or a deep curiosity and fascination with the task. This aspect of creativity can be greatly influenced by teachers who support autonomy, stimulate curiosity, encourage fantasy, and provide challenge.

CREATIVITY AND COGNITION. Is creativity distinct from intelligence? We saw earlier that Sternberg included creative intelligence in his three-part model. Results of some fascinating research on creativity and the brain suggest that about half the neural networks in the brain involved in completing general intelligence tests are shared with the neural networks involved in creativity (divergent thinking) tests (Firth et al., 2020). It is possible that intelligence contributes to creativity through executive control processes such as quickly searching memory, manipulating images to "see" solutions, and evaluating alternatives. The short conclusion is "Similar functional brain networks support creative cognition and intelligence" (Frith et al., 2020, p. 19).

Having a rich store of knowledge in an area is the basis for creativity, but something more is needed. For many problems, that "something more" is the ability to see things in a new way—**restructuring** the problem, which leads to a sudden *insight*. Often this happens when a person has struggled with a problem or project and then sets it aside for a while. Leaving the problem for a time probably interrupts rigid ways of thinking so you can restructure your view of the situation and think more divergently (Gleitman et al., 1999). Creativity requires extensive knowledge, flexibility, and the continual reorganizing of ideas as well as motivation and persistence.

Restructuring
Conceiving of a problem in a new or different way.

CREATIVITY AND DIVERSITY. As Dean Simonton said, even with years of research on creativity, "Psychologists still have a long way to go before they come anywhere close to understanding creativity in women and minorities" (2000, p. 156). White Western men have been the focus of creativity research and writing over the years. So we often judge creativity based on Western male standards and focus on thinking and problem solving, not on crafts, movement, or other forms of creativity (Glăveanu, 2018). However, patterns of creativity in other groups are complex—sometimes matching and sometimes diverging from patterns found in traditional research.

In another connection between creativity and culture, research suggests that being on the outside of mainstream society, being bilingual, or being exposed to other cultures might encourage creativity (Simonton, 2000). In fact, true innovators often break rules. "Creators have a desire to shake things up" (Winner, 2000, p. 167). And even for those who are not outside the mainstream, participation in multicultural experiences apparently supports retrieving novel or unconventional ideas from memory and creative performance, such as generating insightful solutions to problems. These effects are especially strong when people open themselves up to divergent ideas and when the situation does not emphasize finding quick, firm answers. Multicultural individuals are particularly willing to consider and build on unfamiliar ideas, entertain conflicting alternatives, and connect ideas in unlikely ways (Leung & Chiu, 2010; Maddux & Galinsky, 2009). So even though your students may not be able to travel to Tibet or Tonga, they still could become more creative problem solvers if they learned about different cultures.

Creativity in the Classroom

What might teachers do to foster or to inhibit creative thinking? All too often, in the crush of day-to-day classroom life, teachers stifle creative ideas without realizing it. Teachers are in an excellent position to encourage or discourage creativity through their acceptance or rejection of the unusual and imaginative. In an interview, Howard Gardner reminded us that creativity is more likely "… if teachers and parents want it to happen and if they create interesting problems, questions, challenges. And, of course, the ambient culture has to value originality, not punish it! It is much easier to quash creativity than to legislate it" (NAEA, 2019, p. 56).

The *Guidelines: Applying and Encouraging Creativity*, adapted from Fleith (2000), Sawyer (2015), and Sattler and Hoge (2006), describes other possibilities for encouraging creativity.

GUIDELINES

Applying and Encouraging Creativity

Accept and encourage divergent thinking.

Examples

1. During class discussion, ask, "Can anyone suggest a different way of looking at this question?"
2. Reinforce attempts at unusual solutions to problems even if the final product is not perfect.
3. Offer choices in topics for projects or modes of presentation (written, oral, visual or graphic, using technology).

Tolerate dissent and question assumptions.

Examples

1. Ask students to support dissenting opinions.
2. Make sure nonconforming students receive an equal share of classroom privileges and rewards—allow students to be eccentric.
3. Identify and examine unstated assumptions—Where are we starting? What is the real problem?

Encourage students to take reasonable risks and trust their own judgment.

Examples

1. When students ask questions you think they can answer, rephrase or clarify the questions and direct them back to the students.
2. Give ungraded assignments from time to time.
3. Celebrate mistakes as opportunities to dig deeper and learn.
4. Take risks in your own teaching. Model how to learn from successes or failures of risk taking.

Emphasize that everyone is capable of creativity in some form.

Examples

1. Avoid describing the feats of great artists or inventors as if they were superhuman accomplishments.
2. Recognize creative efforts in each student's work. Have a separate grade for originality on some assignments.

Provide time, space, collaborative partners, and materials to support creative projects.

Examples

1. Collect "found" materials—buttons, stones, shells, paper, fabric, beads, seeds, drawing tools, clay—for collages and creations; try flea markets and friends for donations. Have mirrors and pictures for drawing faces.
2. Tie learning to real-world problems—for example, have student groups create nonprofit organizations to address a real community problem, write a grant to fund a solution, and then present their ideas to a panel of community members who will choose the most persuasive project (Henriksen & Mishra, 2015).
3. Follow up on memorable occasions (field trips, news events, holidays) with opportunities to draw, write, or make music.
4. Encourage students to tackle problems in small groups.

Take your time and play.

Examples

1. Encourage and celebrate fantasy, humor, absurdity, and quirkiness.
2. Play with ideas, what-ifs, materials, melodies, words, movements, puzzles—whatever fits your subject matter.

(Continued)

Be a stimulus for creative thinking.

Examples

1. Use class brainstorming sessions whenever possible. Encourage students to delay judging a particular suggestion for solving a problem until all the possibilities have been considered.
2. Model creative problem solving by suggesting unusual solutions for class problems.
3. Share your own interests and passions in music, art, films, geology, history, crafts, cooking, sports, travel, archeology, languages, fiction, theater, etc., in your teaching.

Capitalize on technology (Starko, 2014).

Examples

1. Have students use free apps such as Spider Scribe (https://www.spiderscribe.net) to create visual maps of ideas and share their ideas with others.
2. Spend the five minutes before lunch or at the end of class creatively by having students practice divergent thinking using Genius on the Go on their iPhone, iPod, or iPad.
3. Encourage students to create a Facebook page for a literary or historical figure using Fakebook from Classtools.net. Go to https://classtools.net/FB/home-page.
4. Use WordClouds (https://www.wordclouds.com) to create word clouds showing the frequency of words used in a particular text or the student's writing. See Figure 5.4 for a word cloud of this cluster.

For more ideas, see http://ecap.crc.illinois.edu and search for "creativity."

Figure 5.4 A Word Cloud of This Cluster

In this word cloud, the frequency of the words in this cluster is indicated by the size of the word, so you can see that "may," "student(s)," "children," "can," and "learning" appear most often.



In applying these guidelines, remember that students need a solid base of knowledge to support the creative process. Creativity is a balance between structure and improvisation.

We turn now to a claim about individual differences that is really controversial—learning styles.

Learning Styles: Proceed with Caution

For many years, researchers have examined individual differences in "styles"—cognitive styles, problem-solving styles, thinking styles, decision-making styles,… the list goes on. The one you will hear most about as a teacher is *learning styles*—proceed with caution!

Learning Styles/Preferences

Learning style usually is defined as the way an individual approaches learning and studying. If you believe you have a personal learning style that is innate and unchanging, you are not alone. In the United States and other industrialized countries around the world, about 80% to 95% of people believe in learning styles. Almost 90% of educators around the world believe in the efficacy of learnings styles (APA, 2019; Newton & Salvi, 2020). But beware: *The notion of learning styles has little research support.*

Learning styles
Characteristic approaches to learning and studying.

Connect and Extend to PRAXIS II®
Learning/Cognitive Styles (I, B1)
Familiarize yourself with the major issues involved with learning and cognitive styles, and understand their implications for classroom practice.

Learning preferences
Preferred ways of studying and learning, such as using pictures instead of text, working with other people versus working alone, learning in structured or in unstructured situations, and so on.

CAUTIONS ABOUT LEARNING STYLES. As we said in Cluster 1, learning style is a "zombie" belief that just won't die. And this zombie is dangerous. The learning styles model can undermine good education. Teachers spend time assessing and tailoring teaching to individual learning styles even though using a variety of methods is more effective. Students try to learn consistent with their "style," even though the effort doesn't help (APA, 2019). In addition, students may restrict their choices unnecessarily. For example, students pigeonholed as "auditory learners" might not pursue careers in the visual arts even though they are interested; opportunities are lost (Swansea University, 2021).

You will hear the term "learning styles" constantly, but we believe **learning preferences** is a more accurate label because most of the writings describe *preferences* for particular learning environments—for example, where, when, with whom, or with what materials, lighting, food, or music you like to study. Several instruments assess students' learning preferences, including the Learning Style Inventory (Dunn et al., 1989), Learning Styles Inventory (Revised) (McLeod, 2010), and the Learning Style Profile (Keefe & Monk, 1986).

Are these useful tools? Assessments of learning style have been strongly criticized (Pashler et al., 2009). In fact, in an extensive examination of learning style instruments, researchers at the Learning Skills Research Centre in England concluded, "With regard to work by Dunn and Dunn, Gregorc, and Riding, our examination of the reliability and validity of their learning style instruments strongly suggests that they should not be used in education or business" (Coffield et al., 2004, p. 127), in part because matching instructional methods to learning styles has no effect on learning (Stahl, 2002). Are you still unconvinced? Let's consider the evidence.

Two experimental studies demonstrate the problems with teaching to particular learning styles. In the first, college students self-assessed their learning style as auditory, visual, or kinesthetic and then were taught according to their professed style. Matching learning style with teaching method *did not* improve learning (Kratzig & Arbuthnott, 2006). When the researchers examined how people identified their own learning styles, they concluded that people's judgments represented preferences rather than superior skills in using auditory, visual, or kinesthetic modalities. If college students have trouble identifying their own learning styles, think about fourth- or ninth-graders trying to identify their styles! In the second study (Rogowsky et al., 2015), college students completed the *Building Excellence Online Learning Styles Assessment Inventory* for age 17 and older (Rundle & Dunn, 2010) to determine whether they had auditory or visual word learning styles. Then the participants were randomly assigned to instruction from a nonfiction book that was either an audiobook or an e-text. Again, matching learning style to mode of instruction had *no effect on comprehension*. In summary, liking to learn in a particular way

does not lead to better learning: "You learn better when you 'go wide,' drawing on all of your aptitudes and resourcefulness, than when you limit instruction or experience to the style you find most amenable" (Brown et al., 2014, p. 4).

WHY ARE LEARING STYLES/PREFERENCES SO POPULAR? Part of the answer is that many thriving commercial companies are making large profits by providing advice to teachers, tutors, and managers about learning styles based on "inflated claims and sweeping conclusions" (Coffield et al., 2004, p. 127). Money talks. You might even have taken a learning styles inventory in one of your classes over the years or online. We all love those "about me" quizzes on the Internet! Also, people like visual materials and animated presentations. But these animations can lead to a phenomenon called an *illusion of understanding*: Students think they understand because the content seems less difficult; they become overly optimistic and don't monitor their learning or process deeply. Lower-ability learners are especially susceptible to developing illusions of understanding with animated presentations (Paik & Schraw, 2013). Finally, Sharlene Nancekivell, interviewed by *ScienceDaily* (APA, 2019), said, "People prefer brain-based accounts of behavior, and they like to categorize people into types. Learning styles allow people to do both of those things" (p. 1).

So, before you try to accommodate all your students' learning preferences, remember that students, especially younger ones, may not be the best judges of how they should learn. Preference for a particular approach does not guarantee that using the approach will be effective. Sometimes students, particularly students who struggle, prefer what is easy and comfortable (e.g., animation to explain difficult material); real learning can be hard and uncomfortable. In some cases, students prefer to learn in a certain way because they have no alternatives; it is the only way they know how to approach the task. These students may benefit from developing new—and perhaps more effective—ways to learn.

Beyond Either/Or

Even though much of the work on matching learning styles to teaching is suspect, with unreliable measures and inflated claims, thinking about learning preferences has some value. First, by encouraging students to think about how they learn, you can help them develop self-monitoring and self-awareness as well as a willingness to try new ways. Schools can make more learning options available, such as having quiet, private corners as well as large tables for working; comfortable cushions as well as straight-backed chairs; brightly lighted desks along with darker areas; headphones for listening to music as well as earplugs; structured as well as open-ended assignments; and information available from visuals, podcasts, websites, and videos as well as books. Will making these modifications lead to greater learning? Here the answer is not clear. If nothing else, some accommodation of student preferences might make your classroom more inviting and student friendly and communicate to your students that you care about them as individuals.

Thus far, we have focused mostly on the varying abilities and preferences of students. For the rest of the cluster, we will consider factors that can interfere with learning. It is important for all teachers to be aware of these issues because laws and policy changes initiated in the mid-1970s continue to expand teachers' responsibilities in working with all students.

Module 16 Summary

Creativity: What It Is and Why It Matters (pp. 201–207)

What is creativity, and how is it assessed? Creativity is a process that involves independently restructuring problems to see things in new, imaginative ways. Creativity is difficult to measure, but tests of divergent thinking can assess originality, fluency, and flexibility. Fluency (the absolute number of answers) is the best measure of divergent thinking.

What can teachers do to support creativity in the classroom? Multicultural experiences appear to help students think flexibly and creatively. Teachers can encourage creativity in their interactions

with students by accepting unusual, imaginative answers; questioning assumptions; modeling divergent thinking; using brainstorming; encouraging and celebrating fantasy and quirkiness, and tolerating dissent.

Learning Styles: Proceed with Caution (pp. 207–208)

Distinguish between learning styles and learning preferences. Learning styles are the characteristic ways a person approaches learning and studying. Learning preferences are individual preferences for particular learning modes and environments.

Should teachers match instruction to individual learning styles? Results of research indicate that students do not learn more when they study in their preferred setting and manner. Many students would do better to develop new—and perhaps more effective—ways to learn.

MODULE 17 IDEA and Response to Intervention

Learning Objective 5.5 Discuss the implications of the IDEA, Section 504 protections, and Response to Intervention for contemporary education.

Individual Differences and the Law

Put Yourself in Their Place Have you ever had the experience of being the only one in a group who had trouble doing something? How would you feel if every day in school you faced the same kind of difficulty while everyone else seemed to find the work easier than you did? What kind of support and instruction would you need to keep on trying and not give up?

IDEA

Since 1975, in the United States, a series of laws, beginning with PL 94–142 (now called the **Individuals with Disabilities Education Act**, or **IDEA**), has led to revolutionary changes in the education of children with disabilities. At the most general level, the law now requires states to provide a **free, appropriate public education (FAPE)** for all students with disabilities who participate in special education. No exceptions—the law requires **zero reject**. This policy also applies to students with communicable diseases such as AIDS. To determine if a student has a disability that qualifies for special services, schools must conduct **nondiscriminatory evaluations**. This means, among other things, using multiple valid and reliable assessment tools and strategies administered in the language that is most likely to give accurate results. Assessments must be selected and administered by trained professionals in ways that do not discriminate on racial or cultural bases (Turnbull et al., 2020). The expenses of meeting the special needs of these students are considered a public responsibility. Every state in the United States has a *child find* system to alert and educate the public about services for children with disabilities and to distribute useful information. Requirements and policies can change. Always stay tuned and keep up with the requirements in your state.

The definition of *disability* is specific in IDEA. The 13 categories of disabilities covered are listed in Table 5.2, along with the numbers and percentage of students in each category. In 2016, about 95% of these students spent some of their school day in general education settings, and 63% were in those classes 80% of the time (Diament, 2019). You can see that no matter what grade or subject you teach, you will work with students with disabilities.

Before we look at the different categories, let's examine the requirements in IDEA. Three major points are of interest to parents and teachers: the concept of "least restrictive placement"; the individualized education program, including nondiscriminatory fair assessments to determine student needs; and the protection of the rights of both students with disabilities and their parents.

Individuals with Disabilities Education Act (IDEA)
Latest amendment of PL 94–142; guarantees a free public education to all children regardless of disability.

Free, appropriate public education (FAPE)
Public funding to support appropriate educational programs for all students no matter their needs.

Zero reject
A basic principle of the Individuals with Disabilities Education Act specifying that no student with a disability, no matter what kind or how severe, can be denied a free public education.

Nondiscriminatory evaluations
A basic principle of the Individuals with Disabilities Education Act specifying that schools must determine each student's disability and educational needs using tools and procedures that are culturally responsive.

Table 5.2 Students Ages 3 to 21 Served Under IDEA

Thirteen categories of students are served under IDEA. The table shows the number of students in each category in the 2018–2019 school year (nces.ed.gov).

DISABILITY	NUMBER OF STUDENTS SERVED	PERCENTAGE OF STUDENTS SERVED
Specific learning disabilities	2,367,868	33.2
Speech/language impairments	1,378,490	19.3
Other health impairments (not orthopedic)	1,048,689	14.7
Autism spectrum disorders	761,625	10.7
Developmental delay	478,637	6.7
Intellectual disability	439,046	6.2
Emotional disturbances	358,028	5.0
Multiple disabilities	133,123	1.9
Hearing impairments	74,224	1.0
Orthopedic impairments	39,208	0.5
Visual impairments	26,895	0.4
Traumatic brain injury	26,825	0.4
Deaf-blind	1,590	0.02
Total	7,134,248	100

Least restrictive environment (LRE)
Educating each child with peers in the general education classroom to the greatest extent possible.

Mainstreaming
Teaching children with disabilities in regular classes for part or all of their school days.

Integration
Fitting the child with special needs into existing class structures.

Inclusion
The integration of all students, including those with severe disabilities, into regular classes.

Individualized education program (IEP)
Annually revised program for an exceptional student that details the present achievement level, goals, and strategies and is drawn up by teachers, parents, specialists, and (if possible) the student.

LEAST RESTRICTIVE ENVIRONMENT. IDEA requires states to develop procedures for educating each child in the **least restrictive environment (LRE)**, a setting that is as close to the general education class setting as possible. Over the years, recommended approaches to achieve this have moved from **mainstreaming** (including children with special needs in a few general education classes as convenient) to **integration** (fitting the child into existing class structures) to **inclusion** (restructuring educational settings to promote belonging for all students) (Avramidis et al., 2000; Scruggs & Mastropieri, 2013). Even though the IDEA legislation does not use the word *inclusion*, today the LRE is assumed to be inclusion as much as possible. However, an emphasis on standardized testing may interfere with good teaching for included students (Friend & Bursuck, 2019; Kemp & Carter, 2006).

INDIVIDUALIZED EDUCATION PROGRAM. The drafters of the laws recognized that each student is unique and will need a specially tailored program to make progress. The **Individualized Education Program (IEP)** is written statement about the services that will be provided to the student. The IEP is created by a team that includes the student's parents or guardians, a general education teacher who works with the student, a special education teacher, a representative of the school district (often the principal), a qualified professional who can interpret the student's evaluation results (often a school psychologist), and (if appropriate) the student. For students 16 and older, the team may include representatives from outside agencies who are providing services to help the student make transitions to life after school. If the school and parents or guardians agree, the team could add other people who have special knowledge of the child (e.g., a therapist). The program usually is updated each year. To see the full requirements, go to sites.ed.gov/idea and search for "Section 1414(d)."

The IEP includes:

1. The student's *present level of academic achievement and functional performance* (sometimes referred to as *PLAAFP*, or just *PLOP*—present level of performance). This can include social skills, behavior, communication skills, and any other areas of concern.
2. *Annual goals*—measurable performance goals for the year in academic and/or nonacademic areas, depending on the student's strengths and weaknesses. Students with significant needs or multiple disabilities may also have *short-term objectives*, or *benchmarks*, to make sure progress is continuous. Goals should enable the student to access the general education curriculum.

3. The plan must tell *how progress toward these goals and objectives will be measured*. Parents must get progress reports at least as often as report cards are sent home for all students.
4. A statement of *specific special education and related services* to be provided to the student and details of when and where those services will be initiated and when they will end. This statement can include descriptions of supplementary aids and assistive technologies (e.g., using speech recognition software to dictate answers or compose essays or writing using a computer). Services must be based on solid research.
5. A *justification* for how much of the student's program *will not* be in general education classrooms and school settings.
6. A statement about how the student will *participate in state and district-wide assessments*, particularly those required by the federal accountability procedures, what alternative assessments the student will take (if any), and justifications for these decisions.
7. If the student has significant behavior problems, then the IEP must have a *behavior intervention plan based on a functional assessment* of the student's behavior. (We explore functional behavioral assessment in Cluster 7.)
8. Beginning at age 14 and by age 16, a statement of needed *transitional services* to move the student toward further education or work in adult life (Friend & Bursuck, 2019).

To see IEPs for elementary and secondary school students, simply do a web search for "example IEPs."

THE RIGHTS OF STUDENTS AND FAMILIES. Several stipulations in IDEA protect the rights of parents and students. Schools must have procedures for maintaining the confidentiality of student records. Testing practices must not discriminate against students from different ethnic, linguistic, and cultural backgrounds. Parents have the right to see all records related to the testing, placement, and teaching of their child. If they wish, parents may obtain an independent evaluation of their child. Parents may bring an advocate or representative to the meeting at which the IEP is developed. Students whose parents are unavailable must be assigned a surrogate parent to participate in the planning. Parents must receive written notice (in their native language) before any evaluation or change in placement is made. Finally, parents have the right to challenge the program developed for their child, and they are protected by due process of law. Because teachers often have conferences with these families, the *Guidelines: Family and Community Partnerships* will help make the meetings more effective; actually these guidelines apply to meetings with all your students and their parents.

Connect and Extend to PRAXIS II®

Individual Education Programs (IEP) (I, B3)

When you sign an IEP, you are signing an important educational and legal document. Be sure that you can explain the purpose of an IEP, identify its components, and describe the kinds of information that can be contained in one.

GUIDELINES

Family and Community Partnerships

Productive Conferences

Plan and prepare for a productive conference.

Examples

1. Have a clear purpose, and gather the needed information. If you want to discuss a student's progress, have work samples available.
2. Send home a list of questions, and ask families to bring the information to the conference. Sample questions from Friend and Bursuck (2012, p. 89) are:
   a. What are your priorities for your child's education this year?
   b. What information would you like me to know that would help me better understand and instruct your child? What are your child's learning strengths? Unique needs?
   c. What are the best ways to communicate with you? Phone or voicemail? Email or text message? Face-to-face? Written notes?
   d. What questions do you have about your child's education?

(Continued)

e. How could we at school help make this the most successful year ever for your child?
f. Are there any topics you want to discuss at the conference for which I might need to prepare? If so, please let me know.
g. Would you like other individuals to participate in the conference? If so, please give me a list of their names so I can invite them.
h. Would you like me to have particular school information available? If so, please let me know.

During the conference, create and maintain an atmosphere of collaboration and respect.

Examples

1. Arrange the room for private conversation. Put a sign on your door to prevent interruptions. Meet around a conference table for better collaboration. Have tissues available.
2. Address family members as "Mr." and "Ms.," not "Mom" and "Dad" or "Grandma." Use the child's name.
3. Listen to families' concerns, and build on their suggestions for their children.
4. Avoid education jargon and acronyms such as PLAAFP, PLOP, ADHD, IEP, FAPE, and IDEA.

After the conference, keep good records and follow up on decisions.

Examples

1. Make notes to yourself, and keep them organized.
2. Summarize any actions or decisions in writing, and send a copy to the family and any other teachers or professionals involved.
3. Communicate with families on other occasions, especially when there is good news to share.

For more information about parent conferences, see https://www.scholastic.com and search using "parent teacher conference."

Not all students who need special accommodations in school are covered by IDEA or are eligible for the services provided by the law. But these students' educational needs may be covered by other legislation—read on.

Section 504 Protections

As a consequence of the civil rights movement in the 1960s and 1970s, the federal government passed the Vocational Rehabilitation Act of 1973. **Section 504** of that law prevents discrimination against people of any age with disabilities in any program that receives federal money, such as public schools. Through Section 504, all school-age children are ensured an equal opportunity to participate in school activities. The definition of *disability* is broad in Section 504. Two major groups are considered for Section 504 accommodations: students with medical or health needs (e.g., diabetes, drug addiction or alcoholism, severe allergies, communicable diseases, or temporary disabilities resulting from accidents) and students with ADHD, if they are not already covered by IDEA.

Section 504
A part of civil rights law that prevents discrimination against people with disabilities in programs that receive federal funds, such as public schools.

If a student has a condition like those listed above that substantially limits participation in school and school-related activities such as field trips, then the school must develop a plan for giving that student access to an education even if the school gets no extra funds. To get assistance through Section 504, students must be assessed, often by a team, and a plan developed that covers both instruction and extracurricular activities. Unlike IDEA, however, Section 504 has fewer rules about how this must happen, so individual schools design their own procedures (Friend & Bursuck, 2019). Look at Table 5.3 to see examples of the kinds of accommodations that might be made for a student. Many of these ideas seem to be "just good teaching." But I have been surprised to see how many teachers won't let students use calculators or audio recorders because "they should learn to do it like everyone else!"

Table 5.3 Examples of Accommodations Under Section 504

The types of accommodations that can be written into a Section 504 plan are almost without limit. Some accommodations may relate to physical changes in the learning environment (e.g., air filters are installed to remove allergens). However, many students who have Section 504 plans have functional impairments related to their learning or behavior, and their needs are somewhat similar to those of students with disabilities. A few instructional accommodations that could be incorporated into a Section 504 plan are:

- Seat the student nearest to where the teacher leads most instruction.
- Provide clues such as clock faces indicating beginning and ending times for instruction.
- Establish home–school communication systems for monitoring behavior.
- Fold assignments in half so that the student is less overwhelmed by the quantity of work.
- Make directions telegraphic; that is, concise and clear.
- Record lessons so the student can listen to them again.
- Use multisensory presentation techniques, including peer tutors, experiments, games, and cooperative groups.
- Mark right answers instead of wrong answers.
- Send a set of textbooks to be left at home so that the student does not have to remember to carry books to and from school.
- Provide audio books so the student can listen to assignments instead of reading them.

Source: From Friend, M. & Bursuck, W. D. (2019) *Including Students with Special Needs: A Practical Guide for Classroom Teachers* (8th ed.). Reprinted and electronically reproduced by permission of Pearson Education, Inc., Upper Saddle River, New Jersey.

The **Americans with Disabilities Act of 1990 (ADA)** prohibits discrimination against individuals with disabilities in employment, transportation, public access, local government, and telecommunications. This comprehensive legislation extends the protections of Section 504 beyond the school and workplace to libraries, local and state governments, restaurants, hotels, theaters, stores, public transportation, and many other settings.

Americans with Disabilities Act of 1990 (ADA)
Federal legislation prohibiting discrimination against individuals with disabilities in employment, transportation, public access, local government, and telecommunications.

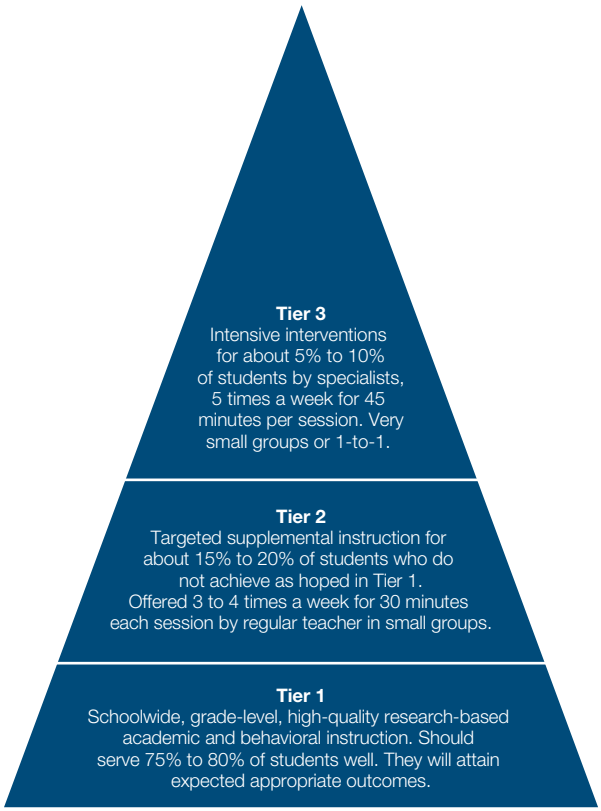
Response to Intervention

One of the problems for students with serious learning problems is that they have to struggle through the early grades, often falling further and further behind, until they are identified, assessed, qualified for an IDEA category, receive an IEP, and finally get appropriate help. This has been called the "wait to fail" model. The reauthorization of IDEA in 2004 gave educators a new option for assessing and educating students who might have serious learning problems. This process is called **response to intervention (RtI)**. The main goal of RtI is to make sure students get appropriate research-based instruction and support as soon as possible, in kindergarten if they need it, before they have fallen too far behind. A second goal is to make sure teachers are systematic in documenting the interventions they have tried with these students and describing how well each intervention worked. In addition, instead of using the discrepancy between IQ scores and student achievement to identify students with specific learning disabilities, educators can now use RtI criteria to determine who needs more intensive learning support (Klinger & Orosco, 2010; Scruggs & Mastropieri, 2013). However, this last use of RtI has been criticized for not being a valid or reliable way of assessing students with learning disabilities because it does not provide a comprehensive and thorough picture of the student's strengths and weaknesses, including documenting other problems that might be present (Reynolds & Shaywitz, 2009).

One common way of reaching these RtI goals is a *three-tiered system*. The first tier is to use strong, well-researched ways of teaching all students. (We will look at these kinds of approaches in Clusters 13 and 14.) For example, teachers might design ways to incorporate every student's individual interests into class assignments, thus more effectively engaging all their students, including those with autism spectrum disorders and those with ADHD. A teacher who is concerned about the behavior of one or several students might work with the school psychologist to develop a class-wide behavior management program and then document which students do or do not respond to the new program. You can see from this description of Tier 1 that RtI is appropriate for all students—it is just good teaching that is consistent with differentiated instruction and universal design for learning (UDL), discussed in Cluster 14.

Response to intervention (RtI)
A process to make sure students get appropriate research-based instruction and support as soon as possible and that teachers are systematic in documenting the interventions they have tried with these students so they can use this information in planning instruction.

Figure 5.5 Three Tiers of Service and Support in Response to Intervention



Source: Based on Friend, M. P., & Bursuck, W. D. (2019). *Including students with special needs: A practical guide for classroom teachers* (8th ed.). Boston, MA: Pearson Education.

Students who are struggling in the Tier 1 curriculum, as identified by ongoing, quality classroom assessments, are moved to the second tier and receive extra support. About 15% of students will need to be moved to Tier 2 for individual or group work with a specialist, social skills instruction, or counseling, for example. To be effective at this level, instruction must be intensive and focused on each student's needs. If some students still make limited progress, usually about 5% of students, they move to Tier 3 for additional one-to-one, intensive help and perhaps a special needs assessment (Denton et al., 2013; Lonigan & Phillips, 2016; Sullivan, & Castro-Villarreal, 2013). Figure 5.5 summarizes the tiers.

The RtI approach has at least two advantages. First, students get extra help right away. Second, if the students reach the third stage of RtI, the information gained based on the students' responses to the different interventions at Tier 1 and Tier 2 can be used for IEP planning. In order to achieve these advantages, general education teachers, particularly in the early grades, must be able to teach and assess using high-quality, research-based approaches.

Even with intensive, high-quality Tier 3 interventions, some students might continue to struggle and will need extended support, instruction, and practice (Denton et al., 2013). Thus far, RtI has been most successful for younger students and with basic processes such as letter-sound connections in learning to read. We don't know as much about how students with learning challenges respond to more sophisticated learning tasks. Also, there is quite a bit of variability in the ways individual schools define evidence-based practices, lack of response to teaching, and progress monitoring (Scruggs & Mastropieri, 2013; Sullivan, & Castro-Villarreal, 2013). For more information on RtI, go to the website of the National Center on Response to Intervention (rti4success.org).

This has been a brief, selective look at the needs of children. If you decide that students in your class might benefit from special services of any kind, the first step is making a referral. How would you begin? Table 5.4 guides you through the referral process. In Cluster 14, when we discuss differentiated teaching, we will look at more ways to reach all your students.

Module 17 Summary

Individual Differences and the Law (pp. 209–214)

Describe the main legal requirements that pertain to students with disabilities. Beginning with Public Law 94–142 (1975) and continuing with many reauthorizations including IDEA, the Individuals with Disabilities Education Act (2004), the requirements for teaching students with disabilities have been spelled out. Each learner or student with special needs (zero reject) should be educated in the least restrictive environment (LRE) according to an individualized education program (IEP). The laws also protect the rights of students with special needs and their parents. In addition, Section 504 of the Vocational Rehabilitation Act of 1973 prevents discrimination against people with disabilities in any program that receives federal money, such as public schools. Through Section 504, all school-age children are ensured an equal opportunity to participate in school activities. The definition of disability is broad in Section 504 and in the Americans with Disabilities Act.

What is Response to Intervention (RtI)? RtI is an approach to supporting students with learning problems as early as possible, not waiting for years to assess, identify, and plan a program. One RtI process is a three-tiered system. The first tier is to use a strong, well-researched way of teaching all students. Students who do not do well with these methods are moved to

Table 5.4 Making a Referral

1. Contact the student's parents. It is very important that you discuss the student's problems with the parents *before* you refer.
2. Before making a referral, check *all* the student's school records. Has the student ever:
   - Had a psychological evaluation?
   - Qualified for special services?
   - Been included in other special programs (e.g., for disadvantaged children; speech or language therapy)?
   - Scored far below average on standardized tests?
   - Been retained?

   Do the records indicate:
   - Good progress in some areas, poor progress in others?
   - Any physical or medical problem?
   - That the student is taking medication?
3. Talk to the student's other teachers and professional support personnel about your concern for the student. Have other teachers also had difficulty with the student? Have they found ways of dealing successfully with the student? Document the strategies that you have used in your class to meet the student's educational needs. Your documentation will be useful as evidence that will be helpful to or be required by the committee of professionals who will evaluate the student. Demonstrate your concern by keeping written records. Your notes should include items such as:
   - Exactly what you are concerned about
   - Why you are concerned about it
   - Dates, places, and times you have observed the problem
   - Precisely what you have done to try to resolve the problem
   - Who, if anyone, helped you devise the plans or strategies you have used
   - Evidence that the strategies have been successful or unsuccessful

   Remember that you should refer a student only if you can make a convincing case that the student probably cannot be served appropriately without special services. Referral begins a time-consuming, costly, and stressful process that is potentially damaging to the student and has many legal ramifications.

the second tier and receive extra support and additional, small-group instruction. If some students still make limited progress, they move to the third tier for one-to-one, intensive help and perhaps a special needs assessment.

MODULE 18 Teaching Every Student

Learning Objective 5.6 Understand and address the special educational needs of students with learning challenges.

Students with Learning Challenges

Before we look at some of the learning challenges children face, let's review recent work on the neuroscience of learning difficulties. With all of the new technologies, the amount of research on the brain and learning disabilities has grown exponentially.

Neuroscience and Learning Challenges

We now know that many factors also are involved in the learning challenges students face. Certainly injuries, dysfunctions, or diseases of the brain and central nervous system can lead to disabilities in language, mathematics, attention, or behavior. Studies of the brains of students with specific learning disabilities and with attention-deficit disorders show some differences in structure and activity compared to those of students without such problems (Hoogman et al., 2020). For example, students with dyslexia (a language and reading disability) have structural and/or functional differences in the left temporal lobes of

their brains (Hallahan et al., 2019). In people with attention disorders, some areas of the brain may be smaller. The flow of blood appears to be lower than typical in the cerebellum and frontal lobes, and the levels of some neurotransmitter chemicals and electrical activity are different in certain brain areas, compared to people without attention deficits (Barkley, 2006). Elementary school students with specific language disabilities appear to have immature auditory systems: Their brains process basic auditory information in a way similar to the brains of children 3 to 4 years younger (Goswami, 2004). The implications of these brain differences for instruction are still being worked out. It is difficult to determine exactly which came first, the learning problems or the brain differences (Friend, 2018).

Quite a bit of research on learning problems has focused on working memory (discussed in Cluster 8), partly because working memory capacity is a good predictor of a range of cognitive skills including language understanding, reading and mathematics abilities, and fluid intelligence (Alloway, 2018; Bayliss et al., 2005; Tourva et al., 2016). In addition, some studies indicate that students who have specific learning disabilities in reading and mathematics problem solving have considerable difficulties with working memory (Maehler & Schuchardt, 2016; Melby-Lervåg & Hulme, 2013). Specifically, these students have problems using the system of working memory that holds and works with verbal and auditory information. Because children with learning disabilities have trouble holding on to words and sounds, it is difficult for them to put the words together to comprehend the meaning of a sentence or figure out what a math story problem is really asking about.

An even more serious problem may be difficulties retrieving needed information from long-term memory, so it is hard for these children to simultaneously hold on to information (e.g., the result from the first two figures multiplied in an algebra problem) while they have to transform new incoming information, such as the next numbers to add. Important bits of information keep getting lost. Finally, children with learning disabilities in arithmetic and problem solving seem to have problems holding visual–spatial information such as number lines or quantity comparisons in working memory, so creating mental representations of "less than" and "greater than" problems is challenging (Menon, 2016).

As you saw in Table 5.2, about 33% of all students receiving some kind of special education services in the public schools are diagnosed as having specific learning disabilities—by far the largest category of students with disabilities.

Students with Specific Learning Disabilities

How do you explain a student who struggles to read, write, spell, or learn math even though the student doesn't have intellectual disabilities, emotional problems, or educational disadvantages and has normal vision, hearing, and language capabilities? The student probably has a **specific learning disability (SLD)**, but there is no fully agreed-upon definition of this term. One text gives three definitions for specific learning disability (Hallahan et al., 2019), including the definition used in IDEA: "a disorder in one or more of the basic psychological processes involved in understanding or using language, spoken or written, that may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculation" (p. 110). Most definitions agree that students with specific learning disabilities perform significantly below what would be expected, given their other abilities. For another widely used definition from the National Joint Committee on Learning Disabilities, go to http://www.ldonline.org and search "definition." We use the phrases *specific learning disability* and *learning disability* in this book to mean the same thing.

Specific learning disability
Problem with acquisition and use of language; might show up as difficulty with reading, writing, reasoning, or math.

Most educational psychologists believe that specific learning disabilities have both physiological and environmental bases, such as differences in brain structures and processes, exposure to toxins before birth from mothers who smoked or drank while pregnant, premature birth, poor nutrition, lead-based paint in the home, or lead in the water supply (think of the possible increase in learning disabilities for children in Flint, Michigan, in the coming years). Genetics probably play a role as well. If parents have a learning disability, their children have a 30% to 50% chance of having a learning disability. How much these different factors will affect individual students depends on the influences and interventions available in their homes and schools and on the students' motivation (Friend, 2018; Grigorenko et al., 2020).

STUDENT CHARACTERISTICS. Students with learning disabilities are not all alike. The most common characteristics are specific difficulties in one or more academic areas; poor coordination; problems paying attention; hyperactivity and impulsivity; problems organizing and interpreting visual and auditory information; seeming lack of motivation; and difficulties making and keeping friends (Hallahan et al., 2019). As you can see, many students with other disabilities (e.g., ADHD) and many normally developing students may have some of the same characteristics. To complicate the situation even more, not all students with learning disabilities will have these problems, and very few will have all of these characteristics. One student might be 3 years behind in reading but above grade level in math, whereas another student may have the opposite strengths and weaknesses, and a third might have problems with organizing and studying that affect almost all subject areas.

Most students with learning disabilities have difficulties reading. Table 5.5 lists some of the most common problems, although these problems are not always signs of learning disabilities. For English-speaking students, these difficulties appear to involve *phonemic awareness*—problems with relating sounds to letters that make up words, making spelling hard as well. *Oral fluency* might also be a problem. Reading is halting and word by word. But even students who sound fine when they read out loud may have trouble with *comprehension* (Friend, 2018).

Math, both computation and problem solving, is another common problem area for students with learning disabilities. Whereas English-speaking students with reading disabilities have trouble associating sounds with letters, students with some math disabilities have difficulty automatically associating numerals (1, 2, 3, etc.) with the correct magnitude—how many is 28, for example. So, before young students learn math computations, some may need extra practice to become automatic in associating numerals with the quantities they represent (Rubinsten & Henik, 2006).

Some students with learning disabilities have trouble planning, putting ideas on paper, or monitoring whether the writing makes sense, as you can see in Figure 5.6 on the next page. Their writing may be hard to read, and their spoken language can be halting and disorganized. Students with learning disabilities often lack effective ways of approaching academic tasks. They don't know how to focus on the relevant information, get organized, apply learning strategies and study skills, change strategies when the one being used isn't working, or evaluate their learning. They tend to be passive learners, in part because they don't know how to learn—they have failed so often. Working independently is especially trying, so they often leave homework and seatwork incomplete (Hallahan et al., 2019).

Table 5.5 Reading Problems of Students with Learning Disabilities

Do any of your students show these signs? These signs could be indications of learning disabilities.

ANXIETY AROUND READING

- Reluctant to read
- Cries or acts out to avoid reading
- Seems tense when reading

DIFFICULTY RECOGNIZING WORDS OR LETTERS

- Inserts an incorrect word, substitutes or skips words
- Reverses letters or numbers—48 for 84, for example
- Mispronounces words—"cape" for "cope"
- Mixes up order of words in sentences: "I can bikes ride" for "I can ride bikes."
- Reads very slowly and with little fluency—starts and stops often

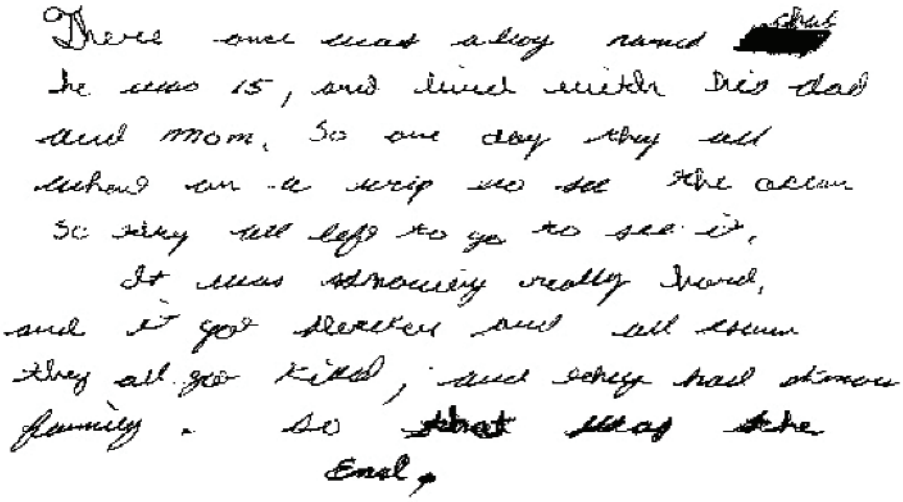
POOR VOCABULARY SKILLS

- Can't read new vocabulary words
- Has limited vocabulary

DIFFICULTY WITH UNDERSTANDING OR REMEMBERING WHAT WAS READ

- Can't recall basic facts from the reading
- Can't make inferences or identify the main idea

Figure 5.6 Writing Sample From a 14-Year-Old Student with a Learning Disability



Source: Friend, M., & Bursuck, W. D. (2019). *Including students with special needs: A practical guide for classroom teachers* (8th ed.). Reprinted by permission of Pearson Education, Inc.

TEACHING STUDENTS WITH LEARNING DISABILITIES. Early diagnosis is important. Because our brains are malleable (see Cluster 3), timely, appropriate interventions can help normalize the atypical neural processes that are associated with learning disabilities (Grigorenko et al., 2020). Also, the students themselves may not understand why they are having such trouble. Without speedy diagnosis, they can be frustrated and come to believe that they can't control or improve their own learning—they develop **learned helplessness**. This is a powerful misconception. These students never exert the effort to discover that they can make a difference in their own learning, so they remain passive and helpless.

Learned helplessness
The expectation, based on previous experiences with a lack of control, that all of one's efforts will lead to failure.

Students with learning disabilities may also try to compensate for their problems and develop bad learning habits in the process, or they may begin avoiding certain subjects out of fear of not being able to handle the work. To prevent these things from happening, teachers should refer the students to the appropriate professionals in the school as early as possible.

Effective interventions for students with specific learning disabilities should be explicit, comprehensive to address all the students' needs, and differentiated/individualized to keep adjusting as students progress. Three general approaches, preferably used together, match these criteria. The first is explicit *direct instruction*, described in Cluster 14. The basics of this approach are clear explanations and demonstrations of new material, teaching in small steps with practice after each step, immediate feedback, and teacher guidance and support. A thorough review by the leading researchers studying specific learning disabilities concluded, "There is little evidence that children with SLDs benefit from discovery, exposure, or constructivist instructional approaches" (Grigorenko et al., 2020, p. 48). The second general method is *peer tutoring*. This can be done at the classroom level when teachers train and monitor students who act a peer tutors. The third approach is *strategy instruction*, described in Cluster 9 (Friend, 2018; Hallahan et al., 2019).

Here are some other strategies for working with students with learning disabilities: In the preschool and elementary years, keep verbal instructions short and simple; have students repeat directions back to you to be sure they understand them; give multiple examples, and repeat main points several times; allow more practice than usual, especially when the material is new. Teach explicit skills with feedback and practice. In reading, emphasize letter-sound awareness, word parts, such a root or base words and prefixes and suffixes, and building understanding. Many of these strategies are useful in secondary grades as well. In addition, directly teach older students self-monitoring strategies, such as cueing students

to ask, "Was I paying attention?" Teach students to use external memory strategies such as note taking and devices such as assignment books, to-do lists, or electronic calendars (Hardman et al., 2017; Turnbull et al., 2020). In every grade, connect new material to knowledge students already have. You might be thinking that these are good ideas for any students who need more support and direct teaching of study skills. You are right.

Students with Hyperactivity and Attention Disorders

Put Yourself in Their Place If a student is struggling with time management and organization issues, what kind of accommodations would you provide?

Connect and Extend to PRAXIS II ADHD (I, B2)

A new student's parent calls you to tell you that a neurologist has diagnosed her child with ADHD. What typical behaviors can you expect from the student? What can you do to support that student's development?

You probably have heard or used the term *hyperactive child*. The notion is a modern one. Years ago such children, like Mark Twain's Huckleberry Finn, were seen as rebellious, lazy, or "fidgety" (Nylund, 2000). Today, ADHD is common. From 5% to 11% of school age children in the United States have been diagnosed with ADHD, according to surveys of parents. Around 5% of children and 2.5% of adults around the world also are affected (Caye et al., 2019; Gargiulo & Bouck, 2021). Closer to home, many student teachers in my program have classes that include five or six students diagnosed as "hyperactive," and in one class, 10 students had that diagnosis. Even more personal, several of my immediate family members have ADHD.

DEFINITIONS. Hyperactivity is not one particular condition but two kinds of problems that may or may not occur together: *attention disorders* and *impulsive-hyperactivity* problems. More than half the children diagnosed in the United States have both conditions. The American Psychiatric Association defines **attention-deficit hyperactivity disorder (ADHD)** as a neurodevelopmental disorder affecting both children and adults. This disorder has a persistent or ongoing pattern of inattention and/or hyperactivity-impulsivity that gets in the way of an individual's daily life or typical development (American Psychiatric Association, DSM-5, 2013). Some indicators are:

Attention-deficit hyperactivity disorder (ADHD)

Current term for disruptive behavior disorders marked by overactivity, excessive difficulty sustaining attention, or impulsiveness.

- *Inattention:* Doesn't pay close attention to class activities, details of work, teacher directions, or class discussions; can't organize work, notebooks, desk, or assignments; easily distracted and forgetful; loses things; procrastinates on long assignments; doesn't study effectively for exams; cheats on tests or assignments.
- *Hyperactivity/impulsivity:* Fidgets and squirms; can't stay in assigned seat; can't move slowly—seems driven by a motor to go fast; talks excessively; blurts out answers; has trouble waiting for a turn; interrupts; rushes through assignments; cuts in line.

Today, most psychologists agree that the main problem for children labeled hyperactive is directing and maintaining their attention, not simply controlling their physical activity. Students with ADHD also have trouble with task switching—once they get started on an activity, it is difficult for them to stop that activity and start a new one (Hallahan et al., 2019). All children show some of these behaviors some of the time, but children with ADHD are likely to have symptoms before age 7, the symptoms occur across many settings (not just school), and lead to problems with learning, increased accidents and injuries, and difficulties getting along with others. Students with ADHD, particularly adolescents, have trouble planning, managing time, regulating their emotions, and completing schoolwork. They are more likely to fail in school, repeat a grade, be suspended or expelled from school, change schools, be referred to special education, experience anxiety, and abuse drugs (Gargiulo & Bouck, 2021; Caye et al., 2019; Cleminshaw et al., 2020).

ADHD usually is diagnosed in elementary school, but research suggests that problems with attention and hyperactivity may begin to show up as early as 3 years of age (Friedman-Weieneth et al., 2007). Even though the condition is diagnosed about three times more often in boys than girls, the gap appears to be narrowing. Boys with ADHD tend to be more active and disruptive, girls more withdrawn and inattentive, so girls may not be identified as often and thus may miss getting appropriate support (Friend, 2018).

Just a few years ago, most psychologists thought that ADHD diminished as children entered adolescence, but now evidence shows that the problems can persist into adulthood for about 7 out of 10 people (Gargiulo & Bouck, 2021). Adolescence—with the increased stresses of puberty, transition to middle or high school, more demanding academic work, and more engrossing social relationships—can be an especially difficult time for students with ADHD. When children diagnosed with ADHD become adults, about 25% experience no more symptoms, 50% have enough symptoms to be diagnosed with ADHD, and about 25% have residual symptoms that can still interfere with their lives, so ADHD definitely is a problem for adults, too (Hallahan et al., 2019). In fact, some research points to the possibility that ADHD might develop in adulthood even without symptoms in childhood (Reddy, 2016).

TREATING ADHD WITH DRUGS. Today, drug therapy for ADHD is increasing, but this approach is controversial, as you can see in the *Point/Counterpoint*.

POINT/COUNTERPOINT: Pills or Skills for Children with ADHD?

About 3% of school-age children (ages 6 to 18) in the United States take some kind of medication for ADHD. Should children with ADHD be given drugs?

Point

Yes, drugs are very helpful in ADHD. Ritalin, the most commonly prescribed ADHD drug, is effective for about 70% of the people who take it (Hallahan et al., 2019). Ritalin and other prescribed drugs such as Adderall, Focalin, Dexadrine, Vyvanse, and Cylert are stimulants. In particular dosages that vary by individual, they appear to influence the release of neurotransmitters and help the executive functions of the brain operate more normally. Short-term effects are possible improvements in behaviors, including increased cooperation, attention, task switching, and compliance. Research suggests that about 70% to 80% of children with ADHD are more manageable and better able to benefit from educational and social interventions when on medication (Hutchinson, 2009). In fact, both stimulants such as Adderall and Ritalin and nonstimulant treatments such as Strattera appear to have some helpful effects for many children and adolescents with ADHD (Kratchovil, 2009). And some evidence indicates that Strattera might have positive effects on working memory, planning, and inhibition—at least for the Chinese children studied (Yang et al., 2009). There have been literally hundreds of randomized clinical trials of the safety and short-term effectiveness of drug therapies for ADHD. "The overall conclusion is that psychostimulants are the most effective available treatment for ADHD, at least in the short-term" (Caye et al., 2019, p. 393). Especially for older students and adults, stimulants are highly effective.

Counterpoint

No, drugs should not be the first treatment tried with ADHD. Many children have negative side effects from drugs such as increased heart rate and higher blood pressure, interference with growth rate, insomnia, weight loss, and nausea (Smith et al., 2014). For most children, these side effects are mild and can be controlled by adjusting the dosage and timing of the drug. However, little is known about the long-term effects of drug therapy, and individuals can have varied reactions to medications over the short and long term. For preschool children and individuals with milder symptoms, non-drug interventions such as behavior therapy and social skills training may be effective (Caye et al., 2019). As a parent or teacher, you need to keep up with the research on treatments for ADHD.

Improvements in behavior resulting from use of the drugs *seldom* lead directly to improvements in academic learning, peer relationships, or emotional regulation—three areas where children with ADHD have great problems. Because children appear to improve dramatically in their behavior, parents and teachers, relieved to see change, may assume the

problem has been cured. It hasn't. The children still need special help in learning, especially interventions focused on task switching and how to make *connections* among elements in readings or presentations in order to construct coherent, accurate representations of the information (Bailey et al., 2009; Cleminshaw et al., 2020; Doggett, 2004).

Beware of Either/Or

The bottom line is that even if students in your class are on medication, it is critical that they also learn the academic and social skills they will need to succeed—*this will not happen by itself*. Students need to learn how and when to apply learning strategies and study skills. Also, they need to be encouraged to persist when challenged by difficult tasks and to see themselves as having control over their learning and behavior. Medication alone will not make this happen, but it may help and open the door to improvements in learning. We need to attack the problem on several fronts, with appropriate medications for an individual's age and symptoms, effective teaching, counseling, and supports for positive behaviors.

ALTERNATIVES/ADDITIONS TO DRUG TREATMENTS. Gregory A. Fabiano and his colleagues (2009) identified 174 studies conducted between 1967 and 2006 that included almost 3,000 participants in behavioral treatments for ADHD; all studies met rigorous standards of quality research. Behavioral treatments involve the application of methods derived from behavioral learning theories such as contingency management, time-out, shaping, self-regulation, and modeling (see Clusters 7 and 11). The researchers then compared treated with untreated groups or individuals before and after one or more different kinds of treatments. Their conclusion? Findings were clear and impressive: "Based on these results, there is strong and consistent evidence that behavioral treatments are effective for treating ADHD" (Fabiano et al., 2009, p. 129). Because these approaches seem to work, we as teachers need to learn when and how to use them. Especially for younger students, these approaches might be good additions to drug therapy. Researchers working with adults in Sweden also found that behavioral methods stressing a balance between accepting and changing ADHD symptoms and behaviors proved effective (Hirvikoski et al., 2011).

Lessons for Teachers: Learning Disabilities and ADHD

Long assignments may overwhelm students with learning disabilities and attention deficits, so give them a few problems or paragraphs at a time, with clear consequences for completion. If the student is highly distractible, consider creating a learning cubicle that blocks outside sights and sounds. Post a classroom schedule, and give clear signals when transitions are coming. Help students organize their desks, materials, notebooks, backpacks, assignment sheets, or electronic calendars. Another promising approach combines instruction in learning and memory strategies with motivational training. The goal is to help students develop the "skill and will" to improve their achievement. They are also taught to monitor their own behavior and encouraged to be persistent and to see themselves as "in control" (Pfiffner et al., 2006).

The notion of being in control is part of a therapy strategy for dealing with ADHD that stresses personal agency. David Nylund (2000) enlists the child's strengths to conquer his or her problems—to put the child in control. New metaphors for the situation are developed. Rather than seeing the problems as inside the child, Nylund helps everyone see ADHD, Trouble, Boredom, and other enemies of learning as outside the child—demons to be conquered or unruly spirits to be enlisted in the service of what the child wants to accomplish. The focus is on solutions.

As a teacher, you can look for times—even short times—when the student is engaged. What is different about these times? Discover the student's strengths, and allow yourself to be amazed by them. Make changes in your teaching that support the changes the student is trying to make. Students with ADHD have some suggestions, too, as you can see in Table 5.6 on the next page taken from Nylund (2000, pp. 202–203).

Table 5.6 Students with ADHD Give Teachers Advice

Students with ADHD gave these recommendations to their teachers (Nylund, 2000):

- Use lots of pictures (visual clues) to help me learn.
- Recognize cultural and racial identity.
- Know when to bend the rules.
- Notice when I am doing well.
- Don't tell the other kids that I am taking Ritalin.
- Offer us choices.
- Don't just lecture—it's boring!
- Realize that I am intelligent.
- Let me walk around the classroom.
- Don't give tons of homework.
- More recess!
- Be patient.

Students with Communication Impairments

Students with communication impairments who are between the ages of 6 and 21 are the second largest group served by special education. You are likely to have these students in class because most of them spend at least 80% of their time in general education classrooms (Friend & Bursuck, 2019). These students may have language impairments, speech impairments, or both. There are many possible causes, because so many different aspects of the individual are involved in learning language and using speech. A student with a hearing impairment will not learn to speak normally. Injuries can cause neurological problems that interfere with speech or language. Students who are not listened to, or whose perception of the world is distorted by emotional problems, will reflect these problems in their language development. Because speaking involves movements, any impairment of the motor functions involved with speech can result in language disorders. And because language development and thinking are so interwoven, any problems in cognitive functioning can affect the ability to use language.

Speech impairment
Inability to produce sounds effectively for speaking.

Fluency disorder
A language disorder characterized by disruptions in the production of speech sounds, commonly called stuttering.

Articulation disorders
Any of a variety of pronunciation difficulties, such as the substitution, distortion, or omission of sounds.

SPEECH IMPAIRMENTS. Students who cannot produce sounds effectively for speaking are considered to have a **speech impairment**. About 5% of school-age children have some form of speech impairment. Articulation problems and **fluency disorders** (stuttering) are the two most common problems.

Articulation disorders include distorting a sound like a lisp (*thumtimes* for *sometimes*), substituting one sound for another (*shairp* for *chair*), adding a sound (*chuch air* for *chair*), or omitting sounds (*chai* for *chair*) (Rosenberg et al., 2011). Keep in mind, however, that most children are 6 to 8 years old before they can successfully pronounce all English sounds in normal conversation. The sounds of the consonants *l, r, y, n, s, v,* and *z* and the consonant blends *sh, ch, ng, zh,* and *th* are the last to be mastered (Friend, 2018). Also, there are dialect differences based on geography that do not represent articulation problems. A child in your class who is from New England might say, "ideer" for "idea" but have no speech impairment.

Stuttering (fluency disorder) generally appears between the ages of 3 and 4. Causes of stuttering are unknown but might include emotional or neurological problems or learned behavior. If stuttering continues more than a year or so, the child should be referred to a speech therapist. Early intervention can make a big difference (Hallahan et al., 2019). When you are working with a student who stutters, speak to the child often, privately, and without hurrying, interrupting, or finishing the child's words and sentences. Pause often, especially after the student finishes speaking. Communicate that taking time to think before speaking is OK. Notice when the stuttering is more and less frequent. Avoid pressuring the child to speak quickly. In class discussions, call on the child early in the discussion so tension won't build up, and ask a question that can be answered with few words. Speak frankly about

Table 5.7 Encouraging Language Development

- Create an atmosphere of acceptance for using language.

  Correct errors by modeling, not directly correcting—Teacher: "Mei-lin, what did Jules do with the frog?" Student: "In pocket." Teacher: "Oh, he put the frog in his pocket?" Student: "Yes."
- Encourage and teach listening skills.

  Model careful listening to students; praise good listening.

  Signal listening: "Now, listen to what I am going to say" or "When we get to number 3, listen carefully for an error I am going to make."

  Simplify vocabulary and sentence structure. Highlight important parts with slower pace or repetition.

  Teach skills directly: predicating, identifying the main idea, drawing inferences.
- Use modeling to expand students' language.

  Student: "Arthea is nice." Teacher: "Yes, Arthea is a very nice person. She is considerate of other people's feelings."
- Provide meaningful, authentic contexts for speaking and writing.

  Write for authentic purposes—letters, emails, tweets.

  Point out and model new vocabulary in class discussions.

Source: Based in part on Friend, M. & Bursuck, W. D. (2019). *Including students with special needs: A practical guide for classroom teachers* (8th ed.). Hoboken, NJ: Pearson, p. 219.

the stuttering, but assure the student that stuttering is nothing to be ashamed of—many successful people, including kings and film stars, have shared the challenge and learned to improve (Friend, 2018; Rosenberg et al., 2011).

Voicing problems, a third type of speech impairment, include speaking with an inappropriate pitch, quality, or loudness or in a monotone. A student with any of these problems should be referred to a speech therapist. Recognizing the problem is the first step. Be alert for students whose pronunciation, loudness, voice quality, speech fluency, expressive range, or rate is very different from their peers. Pay attention also to students who seldom speak. Are they simply shy, or do they have difficulties with language?

Voicing problems
Inappropriate pitch, quality, loudness, or intonation.

LANGUAGE DISORDERS. Language differences are not necessarily language disorders. Students with language disorders are markedly deficient in their ability to understand or express language, compared with other students of their own age and cultural group (Owens, 2020). Students who seldom speak, who use few words or very short sentences, or who rely only on gestures to communicate should be referred to a qualified school professional for observation or testing. Table 5.7 gives ideas for promoting language development.

Students with Emotional or Behavioral Disorders

Students with **emotional and behavioral disorders** can be among the most difficult to teach in a general education class, and they are a source of concern for many prospective teachers (Avramidis et al., 2000). The future is not bright for students with emotional and behavioral disorders who do not get appropriate help. About one-third of these students are arrested during their school years. After high school, they are less likely to keep a job and more likely to be arrested than their peers who do not have disabilities (Harrison et al., 2013), so early intervention is really important.

Emotional and behavioral disorders
Behaviors or emotions—including inappropriate behaviors, unhappiness or depression, fears and anxieties, and trouble with relationships—that deviate so much from the norm that they interfere with the child's own growth and development and/or the lives of others.

Professionals in education define behavioral disorders as behaviors that deviate so much from the norm that they interfere with the child's own growth and development and/or the lives of others. The language in IDEA describes emotional disturbances that involve inappropriate behaviors, unhappiness or depression, fears and anxieties, and trouble with relationships. Table 5.8 on the next page shows the IDEA definition (2017).

More than 350,000 students in the United States have emotional disturbances. As with learning disabilities and ADHD, more boys than girls are diagnosed with these disorders, and Black students are twice as likely as White students to be diagnosed with emotional disturbances (Harper, 2017; Phippen, 2015).

Table 5.8 IDEA Definition of Emotional Disturbance

(i) Emotional disturbance means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

(A) An inability to learn that cannot be explained by intellectual, sensory, or health factors.

(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(C) Inappropriate types of behavior or feelings under normal circumstances.

(D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c)(4)(i).

Source: IDEA Regulations, Sec. 300.8 c 4, Retrieved from U.S. Department of Education. https://sites.ed.gov/idea/regs/b/a/300.8/c/4.

The range of possible emotional and behavioral disorders is wide. And students with other disabilities—learning disabilities, intellectual disabilities, or ADHD, for example—may also have emotional or behavioral problems as they struggle in school. Applied behavior analysis (Cluster 7) and direct teaching of self-regulation skills (Cluster 11) are two useful approaches. Another possibility that has proved helpful for these students is to provide structure, organizational tools, and choices. Here are some ideas from Terri Swanson (2005):

- *Structure the environment* by minimizing visual and auditory stimulation, establishing clear visual boundaries between areas where different behaviors are expected, or organizing supplies in easy-to-use holders.
- *Structure schedules* by posting monthly and daily schedules, having clear starting and ending signals, and specifying clear procedures for turning in work.
- *Structure activities* by color-coding subject folders (blue for math, etc.), posting verbal instructions with visual prompts, or putting all materials needed for an activity in a "Science box."
- *Structure rules and routines*, for example, giving students a script to use when asking other students to play a game with them, writing rules in a positive way, or preparing students for changes in routines such as spring break by reviewing pictures of what will be happening over the break.
- *Offer choices* by providing a short list of alternatives for completing assignments or projects.

Because students with emotional and behavioral disorders frequently break rules and push the limits, teachers often find themselves disciplining them. Be aware that there have been court rulings on disciplining students with serious emotional problems (Yell, 1990). The *Guidelines: Disciplining Students with Emotional Problems* may help when you are faced with these situations.

TRAUMA. You saw in Cluster 1 that about half of all elementary school students in the United States have experienced or witnessed traumatic events. Witnessing these events can cause long-term difficulties with memory and attention, relationships, regulating emotions, controlling behavior, and generally handling day-to-day stress (SAMHSA, 2014). Students may be withdrawn or aggressive, quiet or defiant, which makes it difficult to correctly identify the underlying problem. These students may be diagnosed as having ADHD, depression, anxiety, behavioral disorders, or emotional disturbance. No matter what the diagnosis (even if they had a psychological assessment), many of these students never get appropriate treatment (Jennings, 2019; Koslouski & Stark, 2021). Yet they are in your classrooms. What can teachers do?

GUIDELINES

Disciplining Students with Emotional Problems

Be careful not to violate the due process rights of students. Students and parents must know the behaviors expected and the consequences for misbehavior.

Examples

1. Communicate expectations clearly and in writing.
2. Ask parents and students to sign a copy of the classroom rules.
3. Post rules and consequences in class and on a class web page.

Be very careful with severe consequences that remove students from class for a long time. These constitute a change in the child's IEP and require due process.

Examples

1. Always follow due process for suspensions of more than 10 days.
2. Be aware of possible due process requirements for prolonged periods of time-out (in-school suspension).

Ensure that disciplinary measures for students with severe emotional problems serve a clear educational purpose.

Examples

1. Give a rationale for the consequence or correction that ties an action to a student's learning or the learning of others in the class.
2. Use written behavior contracts that include a rationale.

Make sure the rule and the consequence are reasonable.

Examples

1. Consider the student's age and physical condition.
2. Does the consequence match the offense and the way others in the class are treated?
3. Do other teachers handle similar situations in the same way?
4. Try less intrusive consequences first. Be patient. Move to more severe actions only when less severe procedures fail.

Keep good records and work collaboratively so all involved are informed.

Examples

1. Document the disciplinary measures of all students in a journal or log. List what precipitated the action, what procedures were used, how long the disciplinary actions lasted, the results, modifications to the procedures, and new results.
2. Note meetings with families, special education teachers, and the principal.
3. Make any changes involving management plans with families and other teachers.

Always use positive consequences in conjunction with negative ones.

Examples

1. If students lose points for breaking rules, give them ways to regain points through positive behavior.
2. Recognize genuine accomplishments and small steps—DON'T say, "Well, it's about time you. . . ."

For more information on disciplining students with disabilities, go to http://www.wrightslaw.com and search "disciplining students with disabilities."

The first step in dealing with students who experienced trauma is for schools and teachers to become what mental health providers call **trauma-informed educators**. For teachers, this means recognizing students' histories of trauma; understanding how trauma can affect students' emotions, behavior, and learning; and designing learning environments that address the needs of students while avoiding retraumatizing them (Chafouleas et al., 2016; SAMHSA, 2014). Classroom approaches include many strategies you will encounter in this book, such as functional behavioral assessment and positive behavior supports (Cluster 7)

Trauma-informed educators

Teachers who recognize students' histories of trauma; understand how trauma can affect students' emotions, behavior, and learning; and design learning environments that address the needs of students while not retraumatizing them.

and developing predictable, supportive classroom routines and relationships (Cluster 13). So what might that look like in your classroom?

Jessica Koslouski and Kristabel Stark (2021) interviewed 10 elementary school teachers in different grade levels and settings to explore how they worked with students who had experienced trauma. First, the researchers found that the students in these classrooms had experienced a wide range of traumatic events, including witnessing violence; a parent's death by suicide or overdose; family members incarcerated; being placed in foster care; living in overcrowded homes (10 people in a one-bedroom apartment); natural disasters and having to move to new places; active shooter drills; school lockdowns; traumatic immigration experiences or family separation; taking on adult responsibilities such as second-graders caring for younger siblings; and bullying or discrimination based on race, ethnicity, language, or gender identity. Table 5.9 summarizes the themes in these teachers' responses to their students' traumatic experiences.

You might notice that most of these strategies are aimed at the whole class and do not single out students who have experienced trauma. To build trust and not retraumatize students, it makes sense to avoid shining a spotlight on them personally. Instead, focus on the students' strengths, and create a supportive environment for everyone in class, including yourself (Murphey & Sacks, 2019). As you will see in Cluster 13, positive teacher–student relationships are the foundation for learning and teaching as well as student and teacher well-being (Dombo & Sabatino, 2019).

Table 5.9 Themes in Dealing with Student Trauma

These are ways 10 elementary teachers attempted to support their students.

THEME	EXAMPLES
Prioritize relationships with and between students.	Work on building a community in the classroom.
	Connect with each student on a personal level.
Devote class time to teaching self-regulation and social skills.	Incorporate mindfulness exercises, movement breaks, and Morning Meetings.
	Teach and practice social skills and problem solving.
Ensure academic, social, and emotional supports.	Establish "break stations" where students can color or draw when they are feeling stressed.
	Create predictable routines; give students choices.
	Connect students with school and community resources such as social workers or counselors.
	Help students develop a language of emotions using words and pictures.
Practice cultural humility and responsiveness.	Analyze the curriculum for bias.
	Address the class as "friends" instead of as "boys and girls" to avoid perpetuating purely binary gender identity.
	Be aware of your own cultural identity.
	Intervene when students are being discriminated against by others in the school.
Work to be an ally with parents.	Establish collaborations to support students.
	Translate documents that go home into parents' language.
	Send weekly emails with curriculum updates, student pictures, and discussion points for families.
Continually engage in learning and reflection.	Attend workshops; join teacher book groups.
	One teacher took yoga and then taught some practices to her class for stress reduction.

Source: Based on Koslouski, J. B., & Stark, K. (2021). Promoting learning for students experiencing adversity and trauma: The everyday, yet profound, actions of teachers. *The Elementary School Journal*, published online: https://doi.org/10.1086/712606.

Let's consider another area where teachers may be able to detect problems and make a difference: suicide.

DEATH BY SUICIDE. Of course, not every student with emotional or behavioral problems will consider suicide, but in 2019, death by suicide was the second leading cause of death in the United States for children and youth ages 10 to 24 (NIMH, 2021). Up to 10% of adolescents have attempted suicide at some point, but even more have considered it. Rates are higher for Native Americans and students living in rural communities. There are several general risk factors, and they seem to apply to both male and female Black, Latino, and White adolescents. These are depression and mental illness, substance use disorders, family history of suicide, traumatic event or stress, physical or sexual abuse, tendency to be impulsive or perfectionistic, belief that a person goes to a better place after dying, access to guns or other means of self-harm, difficulties dealing with sexual orientation, and family rejection or conflict. Having more than one of these risk factors is especially dangerous (Boston Children's Hospital, 2021; Friend, 2018).

Death by suicide often comes as a response to life problems—problems that parents and teachers sometimes dismiss. There are many warning signs that trouble is brewing. Watch for intense sadness or hopelessness; changes in appetite, sleeping habits, weight, grades, disposition, energy level, and drug or alcohol use; or a declining interest in friends or activities that were once enjoyable. Students at risk sometimes suddenly give away prized possessions such as iPads, games, clothing, or pets. They might seem irritable or hyperactive and may say things like "Nothing matters anymore," "I shouldn't be here," "If I died, people might love me more," "You won't have to worry about me anymore," or "I wonder what dying is like." They may start missing school or quit doing work. It is especially dangerous if the student not only talks about suicide but also has a plan for carrying it out. And sometimes the risk increases as depression decreases because deeply depressed young people are immobilized and don't have the energy to plan or make a suicide attempt. If a student who has been depressed suddenly seems much better, it could be that he or she has firmly decided to end the pain through suicide, so be alert and in communication with that student (Boston Children's Hospital, 2021). Remember that all types of people commit suicide—male and female, young and old, rich and poor, country people and city people. Suicide happens in every racial, ethnic, and religious group.

If you suspect that there is a problem, talk to the student. Be direct but nonjudgmental, say you are worried, and ask about the student's concerns. One feeling shared by many people who attempt suicide is that no one cared enough to ask how they were feeling. Always, always take the student seriously. Walk the student to the school counselor or other mental health professional in your building. You might need to become an advocate for the student with administrators, parents, or other adults who dismiss the warning signs. Also, be aware that teenage deaths by suicides often occur in clusters: After one student acts or when stories are reported in the media, other teens are more likely to copy the actions (O'Neill et al., 2020; F. P. Rice & Dolgin, 2002).

Jason Flatt appeared to have everything going for him, but at age 16 he took his own life. His father, Clark Flatt, founded the Jason Foundation and worked to bring awareness, training, resources, and support to young people, families, and educators. Twenty states have passed the **Jason Flatt Act**, which requires all educators to complete at least 2 hours of in-service training about awareness and prevention of death by suicide—check https://jasonfoundation.com to see whether your state is one of them. Even if your state has not adopted the legislation, there are great resources for educators on the website, including information about COVID-19, social isolation, and mental health.

Jason Flatt Act

Legislation passed in 20 states that requires educators to complete in-service training about awareness and prevention of death by suicide.

SUBSTANCE USE DISORDER. Modern society makes growing up a very confusing process. Notice the messages from films and billboards: "Beautiful," popular, happy people drink alcohol and smoke cigarettes, with little concern for their health. Men are encouraged to "drink like a man!" We have over-the-counter drugs for almost every common ailment, and constant ads from drug companies broadcast the benefits of new prescription medications.

Table 5.10 Percentage of Students in the United States Grades 8 Through 12 Who Reported Using These Drugs in the Past 30 Days

DRUG	EIGHTH GRADE	TENTH GRADE	TWELFTH GRADE
Any illicit drug	8.7	18.2	22.2
Marijuana	6.5	16.6	21.1
Any vaping (nicotine, marijuana, just flavors)	12.5	23.5	28.2
Inhalants	2.9	1.2	.7
Amphetamines	2.2	1.9	1.7
Alcohol	9.9	20.3	33.6
Cigarettes	2.2	3.2	7.5
Smokeless tobacco	2.3	3.5	Data not available
Juuling	6.3	12.3	12.9

Source: National Institute on Drug Abuse. (2021). Monitoring the Future study: Trends in prevalence of various drugs.

Coffee or an "energy drink" wakes us up, and a pill helps us sleep. And then we tell students to "say no!" to drugs even though both illegal and legal drugs are readily available.

For many reasons, not just because of these contradictory messages, drug use has become a significant problem for students. Accurate statistics are hard to find, but estimates from the *Monitoring the Future* study (National Institute on Drug Abuse, 2021) indicate that 8.7% of eighth-graders, 18.2% of tenth-graders, and 22.2% of twelfth-graders reported using an illicit drug or a drug that is illegal at their age, including inhalants and marijuana, *in the past 30 days*, with vaping being the most popular for younger students and alcohol for twelfth-graders (see Table 5.10 for more information from the *Monitoring the Future* study).

PREVENTION. We should distinguish between experimentation and abuse. Many students try something at a party but do not become regular users. Providing information or "scare" tactics such as the DARE drug prevention program seems to have little positive effect and may even encourage curiosity and experimentation (Dusenbury & Falco, 1995; Tobler & Stratton, 1997).

So what is more effective? Adam Fletcher and his colleagues analyzed research on school programs around the world. One overwhelmingly frequent finding was that after taking into account students' prior drug use and personal characteristics, "disengagement from school and poor teacher–student relations were associated with subsequent drug use and other risky health behaviors" (Fletcher et al., 2008, p. 217). For example, the researchers describe one study that found that being disconnected from school predicted young adolescents' drug use 2 to 4 years later. Thus, engaging adolescents in school, forming positive relationships, and connecting the students to caring adults and peers are all critical in preventing drug abuse. The National Institute on Drug Abuse (NIDA, 2020) lists three principles for school programs aimed at preventing drug abuse. Notice how important social and emotional learning is in these principles:

1. Prevention programs can be designed as early as preschool to address risk factors such as aggressive behavior, poor social skills, and academic difficulties.
2. Programs for elementary grade students should focus on social and emotional learning as well as academic support. Possible targets include self-control, emotional awareness, communication skills, social problem solving, and reading.
3. Middle and high school programs should focus on study skills, communication, peer relationships, self-efficacy, and assertiveness, as well as skills directly related to preventing drug abuse such as strategies and attitudes for resisting drugs and strengthening personal commitments against drug abuse.

THE STIGMA OF MENTAL HEALTH ISSUES. We have examined only a few behavioral and emotional issues that can affect students. Especially with the isolation that came with

COVID-19 lockdowns, schools have seen increases in anxiety and depression among children and adolescents (and teachers too). If you suspect any of your students need professional assessment or intervention, become an advocate and seek additional support for that student. You also can fight against the stigma of mental illness that is so common in society and that is a barrier to asking for or accepting appropriate help. A terrific set of resources for educating your students about mental health and combating stigma is available at https://mentalhealthliteracy.org/toolbox. The "Mental Health and High School Curriculum Guide" is a complete set of modules with pre- and post-tests.

Students with Intellectual Disabilities

Intellectual disabilities
Significantly below-average intellectual and adaptive social behavior, evident before age 18.

A word about terms. **Intellectual disability** is a more current and preferred name for mental retardation because the term *mental retardation* is considered offensive and stigmatizing. In 2007, the American Association on Mental Retardation changed its name to the American Association on Intellectual and Developmental Disabilities (AAIDD) to reflect this rejection of the term *mental retardation.* In 2010, President Obama signed Rosa's Law, which replaced *mental retardation* with *intellectual disability* in federal laws and codes. The act was named for Rosa Marcellino, a young girl with Down syndrome who had worked with her family to remove the term from health and education codes in her home state of Maryland. In 2017 the same replacement was finally made in branches of the U.S. Department of Education; however, *mental retardation* still is used in many schools and conversations. You may also hear the terms *cognitive impairment, general learning disability, developmental disability*, or *cognitive disability.*

The AAIDD definition of *intellectual disability* is "a disability characterized by significant limitations in both intellectual functioning and adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before age 18" (https://www.aaidd.org). Intellectual function is usually measured by IQ tests, with a score below 70 being one of the indicators. But an IQ score below 70 is not enough to diagnose a child as having intellectual disabilities. The child must also have problems with adaptive behavior, day-to-day independent living, and social functioning. This caution is especially important when interpreting the scores of children from different cultures. Defining disability based on test scores alone can result in children who are perceived as having a disability at school but viewed as having no disabilities at home or in their community.

Less than 1% of the population fits the AAIDD's definition of disability in both intellectual functioning and adaptive behavior. This group is further divided by the AAIDD based on the amount of support a person requires to function at his or her highest level. Support varies from intermittent (e.g., as needed during stressful times) to limited (consistent support, but time-limited, such as employment training) to extensive (daily care, such as living in a group home) to pervasive (constant, high-intensity care for all aspects of living) (Hallahan et al., 2019).

As a general education teacher, you may not have contact with children needing *extensive* or *pervasive* support unless your school is participating in a full-inclusion program, but you probably will work with children needing *intermittent* or *limited* support. In the early grades, these students may simply learn more slowly than their peers. They need more time and more practice to learn, and they may have difficulty transferring their learning from one setting to another or putting small skills together to accomplish a more complex task. They often have difficulties with skills required to plan, monitor, and redirect attention and learning strategies (Simon, 2010), so very structured and comprehensive teaching and guidance make sense. The *Guidelines: Teaching Students with Intellectual Disabilities* on the next page list more suggestions.

Learning goals for students with intellectual disabilities depend on the amount of support needed—the less support needed and the less severe the disability, the more you can focus on academic skills. The greater the degree of disability, the more teaching should stress learning about the local environment; social behavior; personal interests; vocational and domestic skills; literacy for living (reading signs, labels, and newspaper ads; completing a job application); job-related behaviors such as courtesy and punctuality; health self-care; and citizenship skills. Teach what the student is ready to learn, but always include academic

GUIDELINES

Teaching Students with Intellectual Disabilities

1. Develop specific learning objectives based on an analysis of each student's learning strengths and weaknesses. No matter what a student knows, he or she is ready to learn the next step.
2. Work on practical skills and concepts based on the demands of adult life.
3. Analyze the task the student will be learning: Identify the specific steps involved in successful completion, and don't overlook any steps in your planning.
4. State and present objectives simply.
5. Present material in small, logical steps. Practice extensively before going on to the next step. Use resources such as computer drill-and-practice exercises in class, or have volunteers and family members continue guiding practice outside class.
6. Do not skip steps. Students with average intelligence can form conceptual bridges from one step to the next and make metacognitive judgments about how they are doing, but children with below-average intelligence need every step and bridge made explicit. Make connections for the student. Do not expect him or her to "see" the connections.
7. Be prepared to present the same idea in many different ways using different representations (verbal, visual, hands on, etc.).
8. Go back to a simpler level if you see the student is not following.
9. Be especially careful to motivate the student and maintain attention. Allow and encourage different ways of expressing understanding—written, drawings, oral responses, gestures, and so on.
10. Find materials that do not insult the student. A middle school boy may need the basic vocabulary of "See Spot run" but will be insulted by the age of the characters and the content of the story.
11. Focus on a few target behaviors or skills so you and the student have a chance to experience success. Everyone needs positive reinforcement.
12. Be aware that students with below-average intelligence must overlearn, repeat, and practice more than children of average intelligence. They must be taught how to study, and they must frequently review and practice their newly acquired skills in different settings.
13. Pay close attention to social relations. Simply including students with below-average intelligence in a general education class will not guarantee that they will be accepted or that they will make and keep friends.
14. Establish peer tutoring programs, and train all students in the class to serve as tutors and as tutees—see Cluster 10 for specifics.

For more information, see https://www.aaidd.org.

Transition programming
Gradual preparation of students with special needs to move from high school into further education or training, employment, or community involvement.

skills at appropriate levels along with life skills (Hallahan et al., 2019). Today, there is a growing emphasis on **transition programming**—preparing the student to live and work in the community. As you saw earlier in the cluster, the law requires schools to design an IEP for every child with disabilities. An ITP (individualized transition plan) may be part of the IEP for students with intellectual disabilities (Friend, 2018).

Students with Health and Sensory Impairments

Some health impairments you may encounter are cerebral palsy, seizure disorders, asthma, sickle cell disease, diabetes, visual impairments, and hearing impairments.

Cerebral palsy
Condition involving a range of motor or coordination difficulties due to brain damage.

Spasticity
Overly tight or tense muscles, characteristic of some forms of cerebral palsy.

CEREBRAL PALSY AND MULTIPLE DISABILITIES. Damage to the brain before or during birth or during infancy can cause a child to have difficulty coordinating his or her body movements. The problem may be very mild, and the child simply appears a bit clumsy, or so severe that voluntary movement is practically impossible. The most common form of **cerebral palsy** is characterized by **spasticity** (overly tight or tense muscles). Many children with cerebral palsy also have secondary handicaps. In the classroom, these secondary handicaps

are the greatest concern—and these are usually what the general education teacher can help with the most. For example, many children with cerebral palsy also have visual impairments, speech problems, and mild to severe intellectual disabilities. But many students with cerebral palsy are average to well above average in measured intelligence (Gargiulo & Bouck, 2021).

SEIZURE DISORDERS (EPILEPSY). A seizure disorder is a cluster of behaviors that occur in response to abnormal electrical and neurochemical activities in the brain, like an electrical storm in the brain (Turnbull et al., 2020). Actually, epilepsy is a spectrum of brain disorders, so sometimes you will see the term *epilepsies*. People with **epilepsy** have recurrent seizures, but not all seizures are the result of epilepsy: Temporary conditions such as high fever, infection, or withdrawal from drugs can also trigger seizures. Seizures take many forms and differ with regard to the length, frequency, and movements involved, but the two main types are *focal onset* and *generalized onset* (Epilepsy Foundation, 2017).

Epilepsy
Disorder marked by seizures and caused by abnormal electrical discharges in the brain.

Focal onset seizure
A seizure originating in just one area of the brain and lasting only a minute or two. The person may experience a sudden feeling of joy, sadness, anger, or nausea or sensations such as taste, smell, or movement in one part of the body.

Generalized onset seizure
A seizure involving a large portion of the brain.

Tonic-clonic seizure
A generalized seizure that includes uncontrolled movements, twitching, or spasms.

Absence seizure
A seizure involving only a small part of the brain and that causes a child to lose contact briefly with ongoing events—short lapses of consciousness.

Focal onset seizures originate in just one area of the brain. A person having a focal seizure may be conscious and experience a sudden feeling of joy, sadness, anger, or nausea or sensations such as taste, smell, or movement in one part of the body. In other focal seizures, the individual may be in a dreamlike state and display repeated movements such as twitching, blinking, or walking in circles. These seizures are short, lasting only a minute or two.

Generalized onset seizures involve both sides of the brain. There are two types: **tonic-clonic seizures** and absence seizures. Most tonic-clonic seizures are accompanied by uncontrolled jerking movements that ordinarily last 2 to 5 minutes, possible loss of bowel or bladder control, and irregular breathing, followed by a deep sleep or coma. On regaining consciousness, the student may be very weary, confused, and in need of extra sleep. Most seizures can be controlled by medication.

A student with a seizure disorder should have an individualized health care plan, often called a seizure plan. If you have a student in your class with a seizure disorder, make sure you have a copy of that plan (Gargiulo & Bouck, 2021). If a student has a seizure accompanied by convulsions in class, the major danger is injury from striking a hard surface during the violent jerking. Immediately and gently lower the student to the floor, away from furniture or walls. Stay calm and reassure the rest of the class, asking them to remain in their seats. Pay attention to the length of the seizure—this can be useful information. Do not try to restrain the child's movements; you can't stop a seizure once it starts. Make the student as comfortable as possible. Never put anything into the student's mouth; it is NOT true that people having seizures can swallow their tongues. Stay with the student until he or she recovers—about 5 to 20 minutes. Don't give water, pills, or food until the student is fully alert. If one seizure follows another and the student does not regain consciousness in between them, if the student is pregnant or has a medical ID that does not say "epilepsy, seizure disorder," if there are signs of injury, or if the seizure goes on for more than 5 minutes, call 911 (Friend & Bursuck, 2019). (See http://www.epilepsy.com and search "first aid" for more guidance.)

Not all generalized onset seizures are dramatic. Sometimes the student loses consciousness just briefly. The student may stare, fail to respond to questions, drop objects, and not be aware of what has been happening for 1 to 30 seconds. These are called **absence seizures**. Such seizures can easily go undetected. If a child in your class appears to daydream frequently, does not seem to know what is going on at times, or cannot remember what has just happened when you ask, you should consult the school psychologist or nurse. The major problem for students with absence seizures is that they miss the continuity of the class interaction because these seizures can occur as often as 100 times a day. If their seizures are frequent, students will find the lessons confusing. Talk with these students to make sure they are able to follow and understand the lesson. Be prepared to repeat yourself periodically.

Sometimes seizures are of *unknown onset*: The beginning of the seizure is not known, maybe because it happened during the night or no one witnessed it. The encouraging news is that the appropriate medication can control all these seizures in 70% to 90% of people (Turnbull et al., 2020).

OTHER SERIOUS HEALTH CONCERNS: ASTHMA, SICKLE CELL DISEASE, AND DIABETES. Many other health problems affect students' learning, in large part because the students miss school, which leads to lost instructional time and missed opportunities for friendships. Asthma is a chronic lung condition affecting about 7 million children in America; this condition is more common for students in poverty. About 25% of the students identified with health impairments have asthma or allergies, so you may have one or two students with asthma in every class. Sickle cell disease is an inherited disorder that occurs most often in African American students but also in individuals with Greek or Italian heritage. Students with sickle cell disease may be tired and have mild to severe pain, repeated infections, and sometimes kidney failure (Friend & Bursuck, 2019). (For more information, see nhlbi.nih.gov and search for the specific health issues.)

Diabetes is a chronic disease that affects the way the body metabolizes sugar (glucose) and, if not treated, can damage almost every major organ in the body, including the heart, blood vessels, nerves, eyes, and kidneys. In type 1 diabetes, also called juvenile diabetes because it is generally identified in childhood, the body cannot produce insulin, so students need to take insulin every day. In type 2 diabetes, there are problems with how the body regulates and uses sugar (glucose) as fuel. Type 2 diabetes can be managed or prevented altogether by eating healthy foods, being physically active, and maintaining a healthy body weight. When diet and exercise modifications are not enough, children will need medications, such as insulin, to manage their blood sugar (NIDDK, 2021). Go to niddk.nih.gov and search for "helping students with diabetes succeed."

With all health conditions, teachers need to talk to parents to find out how the problems are handled at home, what the signs are that a dangerous situation might be developing, and what resources are available for the student. Keep records of any incidents. They may be useful in the student's medical diagnosis and treatment.

Low vision
Vision limited to close objects.

Legally blind
Seeing at 20 feet what a person with normal vision can see at 200 feet and/or having severely restricted peripheral vision.

STUDENTS WITH VISUAL IMPAIRMENTS. Most students with visual impairments have **low vision**—they can read with the aid of a magnifying glass, large-print books, or other aids, although some might benefit from using Braille. Students who are **legally blind** have a visual acuity of 20/200 (they can see at 20 feet what an individual with normal vision can see at 200 feet) or less after correction and/or have severely restricted peripheral vision (Erickson et al., 2013; Hallahan et al., 2019).

Students who have difficulty seeing often hold books either very close to or very far away from their eyes. They may squint, rub their eyes frequently, close one eye, blink often, or say that their eyes burn or itch. After close-up work, they might complain that they are dizzy, have a headache, or are sick to their stomach. Students with vision problems may misread material on the whiteboard or chalkboard, describe their vision as being blurred, be very sensitive to light, or hold their heads at an odd angle. They may become irritable when they have to do desk work or lose interest when they have to follow an activity that is taking place across the room (Hallahan et al., 2019; N. Hunt & Marshall, 2013). Any of these signs should be reported to a qualified school professional.

Special materials and equipment that help these students function in general education classrooms include large-print books; software that converts printed material to speech or to Braille; personal organizers that have talking appointment books or address books; special calculators; an abacus; three-dimensional maps, charts, and models; and special measuring devices. For students with visual impairments, the quality of the print is often more important than the size, so watch out for hard-to-read handouts and blurry copies. Also, when you write or project something on the board, be sure to read it aloud.

The arrangement of the room is important as well. Students with visual impairments need to know where things are, so consistency matters—a place for everything and everything in its place. Leave plenty of space for moving around the room, and make sure to monitor possible obstacles and safety hazards such as trash cans in aisles and open cabinet doors. If you rearrange the room, give students with visual problems a chance to learn the new layout. Also, make sure these students have a buddy for fire drills or other emergencies (Friend & Bursuck, 2019).

STUDENTS WHO ARE DEAF. You will hear the term *hearing impaired* used to describe these students, but the Deaf community and researchers object to this label, so I will use their preferred terms, *deaf* and *hard of hearing*. The consequences of hearing difficulties for learning are serious, especially for immigrants learning a new language.

By the way, the capital "D" in "Deaf community" in the first paragraph of this section refers to a group of people who want to be recognized as having their own culture and language, much like any other language-minority group. This is an example of identity-first language, described at the beginning of this cluster, that honors the wishes of the community (Hallahan et al., 2019). From this perspective, people who are deaf are part of a different culture with a different language, values, social institutions, and literature. N. Hunt and Marshall (2013) quote one deaf professional: "How would women like to be referred to as male-impaired, or whites like to be called black-impaired? I'm not impaired; I'm deaf!" (p. 385). From this perspective, a goal is to help deaf children become bilingual and bicultural, to enable them to function effectively in both cultures. Technological innovations and the many avenues of communication via the Internet have expanded communication possibilities for all people.

Signs of hearing problems include turning one ear toward the speaker, favoring one ear in conversation, or misunderstanding conversation when the speaker's face cannot be seen. Other indications are not following directions, seeming distracted or confused at times, frequently asking people to repeat what they have said, mispronouncing new words or names, and being reluctant to participate in class discussions. Pay special attention to students who have frequent earaches, sinus infections, or allergies.

In the past, educators have debated whether oral or manual approaches are better for children who are deaf or hard of hearing. Oral approaches involve speech reading (also called *lip reading*) and training students to use whatever limited hearing they might have. Manual approaches include sign language and finger spelling. Sign languages such as American Sign Language (ASL) are true, complete, and grammatically complex languages. Research indicates that children who learn both oral and manual methods of communicating perform better in academic subjects and are more socially mature than students who are exposed only to oral methods. Today, the trend is to combine both approaches. However, some members of the Deaf community prefer emphasizing ASL as their first language (Hallahan et al., 2019).

Autism Spectrum Disorders

In 1990 *autism* was added to the IDEA list of disabilities qualifying for special services and is defined as "a developmental disability significantly affecting verbal and nonverbal communication and social interaction, usually evident before age three, that adversely affects the child's educational performance" (34 *Federal Code of Regulations* § 300.7). I will use the term preferred by professionals in the field, **autism spectrum disorders**, to emphasize that autism includes a range of disorders from mild to severe. Fewer than one-third of individuals on the autism spectrum have some level of intellectual impairment while about 10% have extraordinary abilities in areas such as math, music, or memory. More than 80% of students diagnosed with autism are boys. The American Psychiatric Association classifies autism spectrum disorder as a *neurodevelopmental disorder*, a category that includes intellectual disabilities, ADHD, specific learning disabilities, and other disabilities. Estimates of the number of students with autism vary greatly but are increasing dramatically (U.S. Department of Education, 2020). In 2019, the number of students classified on the autism spectrum, almost 762,000, was about 141 times larger than the number in 1992 (Gargiulo & Bouck, 2021).

Autism spectrum disorders
Set of developmental disabilities significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, and ranging from mild to severe.

Students with autism spectrum disorders have difficulty in two main areas: social communications and repetitive/restrictive behaviors. They may avoid eye contact or might not display feelings such as enjoyment or interest in others. Communication may be impaired. About half of these students don't develop useful language. Their speech may be repetitive or sound mechanical. They might obsessively insist on regularity and sameness in their environments and have difficulty thinking imaginatively; change is very disturbing to them.

They may repeat behaviors or gestures and have very limited interests, watching the same YouTube video over and over, for example, or wanting to learn only about dinosaurs, trains, or hurricanes. They might be very sensitive to light, sound, touch, or other sensory information. They may become very confused when the situation changes or questions are asked in a different way (Friend, 2018; Gargiulo & Bouck, 2021; Hallahan et al., 2019).

You may hear the term *Asperger syndrome* referring to students with autism spectrum disorders who have average to above-average intelligence but still have social and behavioral difficulties. In 2013, the American Psychiatric Association eliminated the term *Asperger syndrome* and replaced it with the diagnosis of *high-functioning autism spectrum disorder*. But this label is controversial because these individual might still face difficult challenges in daily life and don't feel all that "high-functioning" (Chawla, 2019).

INTERVENTIONS. Early and intense interventions that focus on physical activity and play, communications, and social relations are particularly important for children with autism spectrum disorders. Without interventions, behaviors such as poor eye contact and odd-seeming mannerisms tend to increase over time (Matson et al., 2007; Schmidt et al., 2021). As they move into elementary school, some of these students will be in inclusive settings, others will be in specialized classes, and many will be in some combination of these two. Collaboration among teachers and the family is particularly important. Strategies such as providing smaller classes, offering structured environments, identifying a class "buddy" to give support, maintaining a safe "home base" for times of stress, ensuring consistency in instruction and transition routines, implementing assistive technologies, and using visuals may be elements of a collaborative plan.

Because many students with autism spectrum disorders have passionate interests, these interests can be incorporated into class activities. For example, in a lesson on writing complete sentences, students who are fascinated with trains can write sentences about trains. Students who love searching the Internet can do research on an assigned topic and contribute to the class learning. Perhaps the student's interest can be folded into interdisciplinary projects. If it is really difficult to incorporate the student's interest into the curriculum, focusing on the interest can be a reward for completing assignments on other topics—an "if-then" agreement. In fact, all of these are good teaching strategies for every student (Friend, 2018; Gunn & Delafield-Butt, 2015). With older students, video-based instruction, such as showing the student a video of someone performing a target skill or behavior and then encouraging the student to imitate and practice that skill, has proved effective. Throughout adolescence and the transition to adulthood, instruction and guidance in life, work, and social skills are important educational goals (de Bruin et al., 2013).

We end the cluster with another group of students who have special needs but are not covered by IDEA or Section 504—students who are highly intelligent or talented.

Module 18 Summary

Students with Learning Challenges (pp. 215–234)

What does research in neuroscience tell us about learning problems? Studies of the brains of students with learning disabilities and with attention-deficit disorders show some differences in brain structures and activity compared to the brains of students without problems. Students with learning disabilities have problems using the system of working memory that holds verbal and auditory information while working with it. Because children with learning disabilities have trouble holding on to words and sounds, it is difficult for them to put the words together to comprehend the meaning of a sentence or to figure out what a math story problem is really asking. Students with learning disabilities also may have difficulties retrieving needed information from long-term memory while transforming new, incoming information such as the next numbers to add. Important bits of information keep getting lost.

What is a specific learning disability? Specific learning disabilities are disorders in one or more of the basic psychological processes involved in understanding or using spoken or written language. Listening, speaking, reading, writing, reasoning, or mathematical abilities might be

affected. These disorders are intrinsic to the individual, presumed to be the result of central nervous system dysfunction, and may occur across the life span. Students with learning disabilities might become victims of learned helplessness when they come to believe that they cannot control or improve their own learning and therefore cannot succeed. A focus on learning strategies often helps students with learning disabilities.

What is ADHD, and how is it handled in schools? *ADHD* is the term used to describe individuals of any age with hyperactivity and attention difficulties. Use of medication to address ADHD is generally effective, but for some students the medication has negative side effects. In addition, little is known about the long-term effects of drug therapy. And the drugs probably will not lead to improvement in academic learning or peer relationships. Approaches that combine motivational training with instruction in learning and memory strategies and behavior modification can be effective.

What are the most common communication disorders? Common communication disorders include speech impairments (articulation disorders, stuttering, and voicing problems) and oral language disorders. If these problems are addressed early, great progress is possible.

What are the best approaches for students with emotional and behavioral disorders? Methods from applied behavior analysis and direct teaching of self-regulation skills are two useful approaches. Students also may respond to structure and organization in the environment, schedules, activities, and rules.

What are some warning signs of potential death by suicide? Students at risk of suicide might show changes in eating or sleeping habits, weight, grades, disposition, activity level, or interest in friends. They sometimes suddenly give away prized possessions such as iPads, games, clothing, or pets. They may seem depressed or hyperactive and start missing school or quit doing work. It is especially dangerous if the student not only talks about suicide but also has a plan for carrying it out.

What should teachers know about student trauma? Many students today have experienced trauma. They may be withdrawn or aggressive, quiet or defiant, or diagnosed as having ADHD, depression, anxiety, behavioral disorders, or emotional disturbance. Teachers must be trauma-informed, which means recognizing a student's history of trauma; understanding how trauma can affect the student's emotions, behavior, and learning; and designing learning environments that address the needs of the student while avoiding retraumatizing. Classroom approaches include many strategies such as functional behavioral assessment/positive behavior supports and developing predictable, supportive classroom routines and relationships.

What defines intellectual disabilities? Before age 18, students must score below 70 on a standard measure of intelligence and must have problems with adaptive behavior, day-to-day independent living, and social functioning. The AAIDD now recommends a classification scheme based on the amount of support that an individual requires to function at his or her highest level. Support varies from intermittent (as needed during stressful times) to limited (consistent support, but time-limited, such as employment training) to extensive (daily care, such as living in a group home) to pervasive (constant, high-intensity care for all aspects of living).

How would you handle a student having aseizure in class? Do not restrain the student's movements. Lower the student gently to the floor, away from furniture or walls. Move hard objects away. Turn the student's head gently to the side, put a soft coat or blanket under the head, and loosen any tight clothing. Never put anything in the student's mouth. Find out from the student's family how they deal with seizures. If one seizure follows another and the student does not regain consciousness in between, if the student is pregnant, or if the seizure goes on for more than 5 minutes, get medical help right away.

What are some signs of visual and hearing impairments? Holding books very close or very far away, squinting, rubbing eyes, misreading the chalkboard, and holding the head at an odd angle are possible signs of visual problems. Signs of hearing problems are turning one ear toward the speaker, favoring one ear in conversation, or misunderstanding conversation when the speaker's face cannot be seen. Other indications include not following directions, seeming distracted or confused at times, frequently asking people to repeat what they have said, mispronouncing new words or names, and being reluctant to participate in class discussions.

Describe autism spectrum disorders and Asperger syndrome. Autisim spectrum disorders include a wide range of developmental disabilities that significantly affect verbal and nonverbal communication and social interaction, usually evident before age three, that have adverse effects on the child's

educational performance. Students with autism spectrum disorders have difficulty in two main areas: social communications and repetitive/restrictive behaviors. Asperger syndrome is one of the autism spectrum disorders. Many students with autism also have moderate to severe intellectual disabilities, but those with Asperger syndrome usually have average-to-above-average intelligence and better language abilities than children with autism. There is a move today to replace the diagnosis of Asperger syndrome with the diagnosis *high-functioning autism spectrum disorder*.

MODULE 19 Recognizing and Teaching Students with Special Talents

Learning Objective 5.7 Recognize and respond to the special educational needs of students who are gifted and talented.

Students Who Are Gifted and Talented

Consider this situation, a true story:

> Latoya was already an advanced reader when she entered 1st grade in a large urban school district. Her teacher noticed the challenging chapter books Latoya brought to school and read with little effort. After administering a reading assessment, the school's reading consultant confirmed that Latoya was reading at the 5th grade level. Latoya's parents reported with pride that she had started to read independently when she was 3 years old and "had read every book she could get her hands on." (Reis et al., 2002, p. 32)

In her struggling urban school, Latoya received no particular accommodations, and by fifth grade, she was still reading at just above the fifth-grade level. Her fifth-grade teacher had no idea that Latoya had ever been an advanced reader.

Here is another true story:

> Alex Wade's field is linguistics. In his search for the perfect language—and "annoyed," he says, with Esperanto—he has created 10 languages and 30 or 40 alphabets, including one language without verbs, just for the challenge. He's taking courses at the University of Nevada, Reno, in Basque, linguistics, and microbiology (because he also has a talent for science).… Alex is 13. (Kronholz, 2011, p. 1)

Gifted and talented
Students who demonstrate outstanding aptitudes and competencies in one or more of many domains.

Latoya and Alex are not alone. They are part of a group with special needs that is often overlooked by the schools: students who are **gifted and talented**. There is growing recognition that students who are gifted are being poorly served by most public schools; in addition, underachievement has become a serious problem (Callahan et al., 2015; Snyder et al., 2014). For example, 16 states do not allow students to start kindergarten early, even when they are reading at an advanced level—a recipe for boredom and ultimately underachievement (Rimm et al., 2018). What would that mean for students like Latoya and Alex?

Who Are These Students?

There are many definitions of *gifted* because individuals can have many different gifts. Remember that Gardner (2003) identified eight or nine separate "intelligences," and Sternberg (2014) suggests a triarchic model. Renzulli and Reis (Renzulli, 2011; Reis & Renzulli, 2009, 2010) have a different three-part conception of giftedness: above-average general ability, a high level of creativity, and a high level of task commitment or motivation to achieve. The National Association for Gifted Children states:

> Students with gifts and talents perform—or have the capability to perform—at higher levels compared to others of the same age, experience, and environment in one or more domains. They require modification(s) to their educational experience(s) to learn and realize their potential. (NAGC, 2019)

To make matters even more complicated, almost every state in the United States has its own definition of *gifted*—check out your state by going to https://www.nagc.org/state-definitions-giftedness.

Children who are truly gifted do more than score high on tests or learn quickly: Their work is original, extremely advanced for their age, and potentially of lasting importance. They might read fluently with little instruction by age 3 or 4, play a musical instrument like a skillful adult, turn a visit to the grocery store into a mathematical puzzle, and become fascinated with algebra when their friends are having trouble with simple addition (Winner, 2000). Contemporary conceptions widen the view of giftedness to include attention to the children's race, ethnicity, culture, language, economic status, and special needs (NAGC, 2019). These newer conceptions are more likely to identify children like Latoya.

WHAT IS THE ORIGIN OF THESE GIFTS? Studies of prodigies and geniuses in many fields document that deep and prolonged practice is necessary to achieve at the highest levels. For example, Newton took 20 years to move from his first ideas to his ultimate contribution (Ericsson & Pool, 2016; Winner, 2000). I remember listening to the early reports of Bloom's study of world-class concert pianists, sculptors, Olympic swimmers, research neurologists, mathematicians, and tennis champions (B. S. Bloom, 1982). To study talent in tennis, Bloom's research team interviewed the top tennis players in the world as well as their coaches, parents, siblings, and friends. One coach said that he would make a suggestion, and a few days later the young athlete would have mastered the move. Then the parents described how their child had practiced that move for hours on end after getting the coach's tip. So focused, intense practice plays a role. Also, the families of prodigies tend to be child-centered and to devote hours to supporting the development of their child's gifts. Bloom's research team described tremendous sacrifices made by families: rising before dawn to drive their child to a swimming coach or piano teacher in another city, working two jobs, or even moving the whole family to another part of the country to be near the best teachers or coaches. The children responded to the family's sacrifices by working harder, and the families responded to the child's hard work by sacrificing more—an upward spiral of investment and achievement.

But hard work will never make me a world-class tennis player or a Newton. There is a role for nature as well. The children Bloom studied showed early and clear talent in the areas they later developed. As children, great sculptors were constantly drawing, and great mathematicians were fascinated with dials, gears, and gauges. Parents' investments in their children came after the children showed early high-level achievement (Winner, 2000, 2003). Recent research suggests that children who are gifted, at least those with extraordinary abilities in mathematics, music, and visual arts, may have unusual brain organization—which can have both advantages and disadvantages. Giftedness in mathematics, music, and visual arts appears to be associated with superior visual-spatial abilities and enhanced development of the right side of the brain. Children with these gifts are more likely to have left-hand dominance but also to have language-related problems.

WHAT PROBLEMS DO STUDENTS WHO ARE GIFTED FACE? Even though longitudinal studies of academically gifted students indicate they are better adjusted and more successful on average as adults than their nongifted peers (Jolly, 2008; Terman et al., 1925; Terman & Oden, 1947, 1959), it would be incorrect to say that every student who is gifted is superior in adjustment and emotional health. In fact, adolescents who are gifted, especially girls, are more likely to be depressed, and both girls and boys may be bored, frustrated, and isolated. Children who are gifted may be impatient with friends, parents, and even teachers who do not share their interests or abilities (Woolfolk & Perry, 2015). One researcher asked 13,000 gifted students from seven states to name one word for their experiences. The most commonly used word was "waiting." "Waiting for teachers to move ahead, waiting for classmates to catch up, waiting to learn something new—always waiting" (Kronholz, 2011, p. 3).

Because their language is well developed, students who are gifted might be seen as show-offs when they are simply expressing themselves. They are sensitive to the expectations and feelings of others, so these students may be vulnerable to criticisms and taunts. Their keen sense of humor and verbal skills can be used as weapons against teachers and other

students or as a defense to diffuse the pain of being bullied. Because they are goal directed and focused, they may seem stubborn and uncooperative. For example, Marilyn Friend and William Bursuck (2019) describe Esteban, an eighth-grader whose response about everything to everyone—peers, parents, and teachers—was "I already know that," which was usually true but often irritating. Adjustment problems seem to be greatest for the students among the most highly gifted, those in the highest range of academic ability (e.g., above 180 IQ). The chance of any teacher encountering a student in this highest-IQ range is only about 1 in 80 over an entire 40-year career—but what if such a student walks into your class (Kronholz, 2011)?

Identifying Students Who Are Gifted and Talented

Identifying children who are gifted is not always easy. Many parents provide early educational experiences for their children. In middle and high school, some very able students deliberately earn lower grades, making their abilities even harder to recognize. Girls are especially likely to hide their abilities (Woolfolk & Perry, 2015).

RECOGNIZING GIFTS AND TALENTS. In general, teachers make reasonable but imperfect predictions of students' academic achievements (Südkamp et al., 2012). Table 5.11 lists the characteristics to notice to make better identifications.

Table 5.11 Characteristics to Observe in Identifying Students Who Are Gifted

READING BEHAVIORS

- Has early knowledge of the alphabet
- Often reads early or unlocks the reading process quickly and sometimes idiosyncratically
- Reads with expression
- Has a high interest in reading; reads voraciously

WRITING BEHAVIORS

- Displays early ability to make written sound–symbol correspondence
- Exhibits fluency and elaboration in story writing
- Uses advanced sentence structure and patterns
- May show an interest in adult topics for writing, such as the state of the environment, death, war, and so on
- Writes on a topic or story for an extended period of time
- Generates many writing ideas, often of a divergent nature
- Uses precise, descriptive language to evoke an image

SPEAKING BEHAVIORS

- Learns to speak early
- Has a high-receptive vocabulary
- Uses advanced sentence structure
- Uses similes, metaphors, and analogies in daily conversation
- Exhibits highly verbal behavior in speech (i.e., talks a lot, speaks rapidly, articulates well)
- Enjoys acting out story events and situations

MATHEMATICAL BEHAVIORS

- Has early curiosity and understanding about the quantitative aspects of things
- Is able to think logically and symbolically about quantitative and spatial relationships
- Perceives and generalizes about mathematical patterns, structures, relations, and operations
- Reasons analytically, deductively, and inductively
- Abbreviates mathematical reasoning to find rational, economical solutions
- Displays flexibility and reversibility of mental processes in mathematical activity
- Remembers mathematical symbols, relationships, proofs, methods of solution, and so forth
- Transfers learning to novel situations and solutions
- Displays energy and persistence in solving mathematical problems
- Has a mathematical perception of the world

Source: Friend, Marilyn, *Special Education: Contemporary Perspectives for School Professionals* Loose Leaf Version, 5th Ed., ©2018. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., Upper Saddle River, New Jersey

Certainly, the students described at the beginning of this section—Latoya, who read so early, and Alex, with his intense interests and creativity in inventing languages—had some of these characteristics. In addition, students who are gifted may prefer to work alone, have a keen sense of justice and fairness, be energetic and intense, form strong commitments to friends (often older students), and struggle with perfectionism (Gargiulo & Bouck, 2021).

Group achievement and intelligence tests tend to underestimate the IQs of very bright children. Group tests can be appropriate for screening, but they are not appropriate for making placement decisions. Many psychologists recommend a case study approach. This means gathering many kinds of information about the student in different contexts: test scores, grades, examples of work, projects and portfolios, letters or ratings from community or church members, self-ratings, nominations from teachers or peers, and so on (Renzulli & Reis, 2003). Especially for recognizing artistic talent, experts in the field can be called in to judge the merits of a student's creations. Science projects, exhibitions, performances, auditions, and interviews are all possibilities. Creativity tests and tests of self-regulation skills may find some children not identified by other measures, particularly minority students who may be at a disadvantage on the other types of tests (Grigorenko et al., 2009). Given the different definitions and wide-ranging procedures for identifying students who are gifted, between 1% and 25% of students in each state in the United States are served in programs for students who are gifted, or about 3 million total (Friend, 2018).

Remember, students with remarkable abilities in one area may have much less impressive abilities in others. And up to 180,000 students in American schools may be gifted *and* have specific learning disabilities. In addition, two other groups are underrepresented in education programs for students who are gifted: girls and students living in poverty (Gargiulo & Bouck, 2021). See Table 5.12 for ideas about identifying and supporting these students.

Table 5.12 Recognizing and Supporting All Students with Gifts and Talents—Especially Students with Specific Learning Disabilities, Girls, and Students Living in Poverty

RECOGNIZING STUDENTS WHO ARE GIFTED AND HAVE LEARNING DISABILITIES

Here are some ideas for supporting students who are gifted and have learning disabilities (McCoach et al., 2001):

- Identify these students by looking longitudinally at achievements.
- Remediate skill deficits, but also identify and develop talents and strengths.
- Provide emotional support; this support is important for all students but especially for this group.
- Help students learn to compensate directly for their learning problems, and assist them in "tuning in" to their own strengths and difficulties.

RECOGNIZING GIFTS IN GIRLS

As young girls develop their identities in adolescence, they often reject being labeled as gifted—being accepted and popular and "fitting in" may become more important than achieving (Basow & Rubin, 1999; Stormont et al., 2001). How can teachers reach girls who are gifted?

- Notice when girls' test scores seem to decline in middle or high school.
- Encourage assertiveness, achievement, high goals, and demanding work from all students.
- Provide models of achievement via speakers, internships, or readings.
- Look for and support gifts in arenas other than academic achievement.

RECOGNIZING STUDENTS WHO ARE GIFTED LIVING IN POVERTY

Health problems, lack of resources, homelessness, fears about safety and survival, frequent moves, and responsibilities for the care of other family members all make achievement in school more difficult for these students. To identify students who are gifted and who live in poverty:

- Use alternative assessments, teacher nominations, and creativity tests.
- Be sensitive to cultural differences in values about cooperative or solitary achievements (Ford, 2000).
- Use multicultural strategies to encourage both achievements and the developments of racial identities.

Teaching Students with Gifts and Talents

Some educators believe that students who are gifted should be *accelerated*—moved quickly through the grades or through particular subjects. Other educators prefer *enrichment*—giving these students additional, more sophisticated, and more thought-provoking work but keeping them with their age-mates in school. Both may be appropriate (Torrance, 1986). One way of accelerating and enriching simultaneously is through *curriculum compacting*—assessing students' knowledge of the material in the instructional unit, then teaching only for those goals not yet reached (Reis & Renzulli, 2004). Using curriculum compacting, teachers may be able to eliminate about half of the usual curriculum content for some students who are gifted without any loss of learning. The time saved can be used for learning goals that include enrichment, sophistication, and novelty (Werts et al., 2007).

ACCELERATION. Many people object to acceleration, but most careful studies indicate that students who are truly gifted who begin primary, elementary, middle, or high school; college; or even graduate school early do as well as and usually better than students who are not gifted and who are progressing at the standard pace. You might remember from Cluster 1 that students who were mathematically talented and who skipped grades in elementary or secondary school were more likely to go on to earn advanced degrees and publish widely cited articles in scientific journals (Park et al., 2013). Other advantages of acceleration include increased interest in school, enhanced self-concept, and positive relationships with older students (Gargiulo & Bouck, 2021).

An alternative to skipping grades is to accelerate students in one or two particular subjects or to allow concurrent enrollment in advanced placement or college courses but keep them with their peers for the rest of the time. For students who are extremely advanced intellectually (e.g., those scoring 160 or higher on an individual intelligence test), the only practical solution likely is to accelerate their education (Rimm et al., 2018).

METHODS AND STRATEGIES. Rather than putting gifted students in a separate program, think about what services each student needs to advance and thrive. Teaching methods for students who are gifted should encourage abstract thinking (formal-operational thought), creativity, reading of high-level and original texts, and independence, not just the learning of greater quantities of facts. In working with students who are gifted and talented, a teacher must be imaginative, flexible, tolerant, and unthreatened by the capabilities of these students. The teacher must ask: What do these children need most? What are they ready to learn? Who can help me challenge them? Challenge and support are critical for all students. But challenging students who know more than anyone else in the school about history or music or science or math can be a challenge! Answers might come from faculty members at nearby colleges, retired professionals, books, museums, the Internet, or older students. Strategies might be as simple as letting a gifted student do math with the next-higher grade. Other options are summer institutes; courses at nearby colleges; classes with local artists, musicians, or dancers; independent research projects; selected classes in high school for younger students; honors classes; and special-interest clubs (Gargiulo & Bouck, 2021; Rimm et al., 2018).

In the midst of providing challenge, don't forget the support. We all have seen the ugly sights of parents, coaches, or teachers forcing the joy out of their talented students by demanding practice and perfection beyond the children's interest. Just as we should not force children to stop investing in their talent ("Oh, Michelangelo, quit fooling around with those sketches, and go outside and play!"), we also should avoid destroying intrinsic motivation with heavy doses of pressure and external rewards.

Module 19 Summary

Students Who Are Gifted and Talented (pp. 236–240)

What are the characteristics of students who are gifted? Students who are truly gifted do more than learn quickly with little effort. The work of students who are gifted is original, extremely advanced for their age, and potentially of lasting importance. These students may read fluently

with little instruction by age 3 or 4. They may play a musical instrument like a skillful adult and become fascinated with algebra when their friends are having trouble with simple addition. Teachers should make special efforts to support underrepresented students who are gifted—girls, students who also have learning disabilities, and children living in poverty.

Is acceleration a useful approach with students who are gifted? Many people object to acceleration, but most careful studies indicate that students who are truly gifted and who are accelerated do as well as and usually better than students who are not gifted and who are progressing at the normal pace. Students who are gifted tend to prefer the company of older playmates and may be bored if kept with students their own age. Skipping grades might not be the best solution for a particular student, but for students who are extremely advanced intellectually (with a score of 160 or higher on an individual intelligence test), the only practical solution may be to accelerate their education.

Cluster 5 Review

Key Terms

Absence seizure
Americans with Disabilities Act of 1990 (ADA)
Articulation disorders
Attention-deficit hyperactivity disorder (ADHD)
Autism spectrum disorders
Automaticity
Cerebral palsy
Convergent thinking
Creativity
Crystallized intelligence
Deviation IQ
Disability
Divergent thinking
Emotional and behavioral disorders
Emotional intelligence
Epilepsy
Exceptional students
Fluency disorder
Fluid intelligence
Flynn effect
Focal onset seizure
Free, appropriate public education (FAPE)
General intelligence (*g*)
Generalized onset seizure
Gifted and talented
Handicap
Identity-first reference
Impairment
Inclusion
Individualized education program (IEP)
Individuals with Disabilities Education Act (IDEA)
Insight
Integration
Intellectual disabilities
Intelligence
Intelligence quotient (IQ)
Jason Flatt Act
Learned helplessness
Learning preferences
Learning styles
Least restrictive environment (LRE)
Legally blind
Low vision
Mainstreaming
Mental age
Nondiscriminatory evaluation
Person-first reference
Response to intervention (RtI)
Restructuring
Section 504
Spasticity
Specific learning disability
Speech impairment
Theory of multiple intelligences (MI)
Tonic-clonic seizure
Transition programming
Trauma-informed educators
Triarchic theory of successful intelligence
Voicing problems
Zero reject

Connect and Extend to Licensure

Multiple-Choice Questions

1. African American students are more likely to be identified for special education services and placed outside of the general education system than are White students. Which one of the following is not a likely explanation for this overrepresentation?

A. High poverty rates, which lead to poor prenatal care, nutrition, and health care

B. Teachers who are unprepared to work with ethnic minority students

C. Biases in teachers' attitudes and in the curriculum

D. The fact that African American students comprise 80% of the population of gifted and talented individuals

2. Developmental psychologist Howard Gardner's multiple intelligences theory continues to have an impact on classrooms in the United States today, based on its reflection of which current classroom strategy?

A. Differentiated instruction

B. Sternberg's triarchic theory of successful intelligence

C. Mainstreaming

D. Response to Intervention (RtI)

3. When a student has been identified as needing special education services, the Individuals with Disabilities Education Act mandates all but which one of the following?

   A. Accommodations must be made during state standardized testing of all students receiving special education services.

   B. States are required to provide a free, appropriate public education (FAPE) for every student with disabilities who participates in special education.

   C. States are required to develop procedures for educating children in the least restrictive environments.

   D. Students receiving special education services must each have an individualized education program (IEP).

4. Several students in Mr. Collins's kindergarten class appear to have deficits in their abilities. The school is unable to assess the children and will not begin providing special education services until next year. Which one of the following solutions would be the best?

   A. Mr. Collins should contact the parents of the students who need services and encourage them to work with their children at home.

   B. The school should wait until next year to begin services.

   C. Mr. Collins should begin Response to Intervention (RtI).

   D. The students in question should be sent to a school that specializes in special education services.

Constructed-Response Questions

Case

Many beginning teachers become overwhelmed when they discover they have numerous students in their classes who have special needs. First-year teacher Paige Morris was no exception. Of her 25 students, seven were identified as needing special education services. Although Ms. Morris was certified in special education and elementary education, she felt ill equipped to write and implement so many Individualized Education Programs (IEPs). To make matters more concerning, three of her students were identified as having ADHD. Ms. Morris began to imagine herself trying to control a chaotic classroom without the tools she needed to succeed.

5. List the parts of an IEP that must be in writing. Identify the aspect(s) of the IEP for which Ms. Morris is responsible.

6. Which parts of each child's program would assist Ms. Morris in better understanding her students before they begin the school year?

What Would They Do?

Teachers' Casebook: Including Every Student

At the beginning of this cluster, we asked you to think critically about how to teach students with a wide range of abilities and challenges. Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Amanda Romando • 6th Grade English Language Arts, Social Studies, Research Skills Teacher

Galileo School for Gifted Learning, Sanford, FL

The first thing I do before school even begins is create a binder with tabs for each student. There, I would add their important documents, such as individualized education programs or health plans. I create a "snapshot" document to keep at the front of the binder for quick reference. This document has details about students' health plans, Exceptional Student Education services, behavior plans, accommodations, etc. This binder is key in helping me to document and track students' needs and services. I find that having it all organized in one place helps me feel more in control and effective in managing the needs of all my students. I can quickly grab the binder when I am called into a student meeting or parent-teacher conference. I encourage every intern and new teacher to create this type of binder. Taking some time to frontload those important logistics will pay dividends throughout the school year.

I work closely with the Exceptional Student Education team in order to ensure that we are addressing the specific needs of each student. I differentiate my lessons in terms of assignment length, reading levels, etc. in order to meet every student at his or her level. I design tasks to include heterogeneous groupings of students and encourage all students to use their special gifts and talents within their cooperative learning environments. All students deserve to feel valued and respected for their unique contributions.

I find that working to build rapport with my students does wonders in helping me get to know them and increase trust. As educators, we know that great learning happens when

students feel safe, respected, and encouraged. Students can truly only learn to their full potential when they are in this type of environment. All the elaborate lesson planning in the world cannot take the place of ensuring that your students know you care about them unconditionally. I also spend time in my classroom talking about the concept of equity, so that students understand that their classmates' educational journey may look different than theirs, and it should. This increases empathy and builds classroom community.

Vanessa Sauer • 2nd–3rd Grade Teacher

Royal Heights Elementary School, Surrey, British Columbia, Canada

Teaching is and should be a collaborative experience. If you have chosen to become a teacher then you more than likely have chosen the path of a lifelong learner. You are probably eager to learn new strategies and understand that you will cycle through many different teaching strategies with the acknowledgement that each student is different, with varying needs. Each exceptionality will differ for each child, even if their diagnosis is titled the same. There is no one size fits all for any students or any group of students, which is where your flexibility and creativity as a teacher will be able to thrive.

Your first priority will be to get to know your students on a personal level. What are their likes, dislikes, motivations, struggles and overall personalities? Among your students with exceptionalities, though, you may need to pay closer attention to their nuances and behaviors to try to understand their complexities and what they will need to feel important and safe.

Reach Out:

Remember you are not alone. At the very beginning of the school year, reach out to your students' parents. I personally call the parents of my entire class at the beginning of the school year just to introduce myself and create a shared understanding that we are in this together, opening the door to share information that will benefit their child's year of learning. If you do not call each parent because this is not a part of your job description (you are correct), then you could simply reach out to those parents of the students with the needs. I would ask the parents about what the children like, what they are passionate about and what types of structures and routines work for them at home. These parents will feel relieved that this year, they have a teacher who cares enough to reach out and work with them throughout the year, a reciprocal learning experience for the good of their child. After building this relationship, have a plan to celebrate the students' successes with parents daily or weekly, outlining the goals they reached and what they are working on next. Notice the small stuff which helps to build their confidence and make them an essential contributor to the class. This communication may be written in a planner or in a weekly "Goal Setting" book that goes back and forth between home and school. Ask your learning support teacher (LST) for help with this type of structure. If there is a language barrier, districts usually offer translators, so ask your acting principal about your options. Don't forget to ask your students' past teachers as well. What worked for them? You are working within a community of educational professionals. Be willing to learn from your colleagues.

Keep Them Close:

Literally have a plan for these students to be in close proximity with adults in your class whether it is you or an educational assistant (EA). Ensure your EA is aware of the structures and plans in place for each student. This will mean setting aside 5 to 10 minutes a week to meet with your EAs to discuss and debrief about expectations to ensure consistency. Use a buddy system. For example, each student has a buddy in the class. Buddies could be used for many things based around inclusion (e.g., serving as safety partners on a field trip; friends that look out for one another on the playground; holding each other accountable for ensuring they have everything they need before leaving for gym or library). Maybe the buddy of the student with asthma has an even more important job of ensuring their buddy has their puffer. Maybe this buddy is also in charge of carrying a first aid kit to gym each day as an extra reminder, while everyone else simply checks in that their buddy has a full water bottle and runners. These buddies could be changed each month or two months which also allows students to get to know all their peers throughout the year.

Model your care for these students with exceptionalities. Give them special jobs they can handle. Maybe your student with ADHD has a special job of watering a certain plant before snack each day. Give these students special jobs! Even if you won't use your clip board for outdoor learning, give a student the job of carrying it anyways! This will help the students become responsible learners and work together, creating a caring community.

Vickie Moriarty • 7th Grade English and Language Arts Teacher

Bath County Middle School, Owingsville, KY

Forming relationships with these students and their parents is the first step to starting off the year right. Based on those meetings, I would create a chart of student accommodations that I could reference during class and while planning lessons. Next, I would ensure my seating arrangements met individual students' needs and created a positive academic environment for all. Some possible seating arrangements I would consider include separating the two ADHD students, having a time-out desk for any student struggling to focus, seating the asthmatic student where they could easily get to

the exit in the event of an attack, placing the student with severe learning disabilities and the autistic student in front or in an easy to reach spot where I could see them easily should they need help or support.

I would let other students help, but only if they wanted to. For example, some students explain things really well to their peers or love to help with technology while others have amazing empathy and patience and love to help other students. I would never require this of students, only if they wanted to and it didn't negatively impact their own work.

Some extra tools in my toolbox include giving students with low impulse control three sticky notes so they could monitor their behavior independently, sending students on "errands" if they seemed agitated, modifying assignments that are too difficult, and rehearsing all upcoming schedule changes with the whole class. Of course, every student's needs are different regardless of labels, so relationships are key because they help me know how much to expect academically and how much attention each will need in class to be most successful. It also helps me know when to push, lighten up, give a kind word, or allow a student to struggle independently.

Maria Soisson • 6th Grade Mathematics Teacher

Walnut Springs Middle School, Westerville, OH

The start of the new year, with a new list of 120 students, is always overwhelming. I wonder how I will ever keep their needs straight and take care of every individual! Before I even see the students, I carefully review their individual needs and organize the information onto one spreadsheet. Additionally, I talk to the intervention specialist as that person is a huge resource throughout the year. Then I take a deep breath and remind myself that by the end of the first nine weeks, I'll know the kids' strengths and weaknesses beyond the spreadsheet and feel confident that we will all be making progress on the standards. How do I help them learn to their full potential? In my class, there is a significant focus on growth mindset. We celebrate mistakes, encourage sharing our stumbling blocks, and rework problems until we are successful and understand (including on tests). All individuals, from the gifted student to the student on an IEP, are expected to grow through exploring the material and allowing themselves a chance to make mistakes. Giving students low-floor high-ceiling tasks is one way that I can differentiate as well as create more opportunity for mistakes! The discussions we have around our growth mindset help build a community of trust that allows all of us to grow and work hard to be successful together. Those positive relationships with the students give me motivation to assist them in reaching their full potential. It also gives them confidence to know that they can work through the challenges I present to them.

Paul Dragin • 9th–12th Grade ESL Teacher

Columbus East High School, Columbus OH

This situation has become the norm—at least in public schools in large urban areas. Students with IEPs should have plans that address their individual cognitive and/or behavioral concerns. This would guide my instructional deviation to help ensure that I am providing the curriculum in a format that is more easily comprehended by those who may have challenges that are greater than mainstream students. The medical issue concerning the student with asthma is something that requires a greater sensitivity to ensure that I am alert to any possible medical emergency that may occur in the classroom. Confidence in this trying situation comes from attempting various strategies with the students and discovering, through trial and error, which are most effective at meeting their diverse educational needs.

Paula Colemere • Special Education, English, and History Teacher

McClintock High School, Tempe, AZ

It is every teacher's dream to have a room full of eager learners who are all on grade level. In my experience, this never happens! In any classroom, there are students who are below, at, or above grade level in their abilities. First, teachers need to know that fair doesn't mean equal. If I assign a five-paragraph essay to the class, but a student with a learning disability in writing struggles to write that much, I could either extend the due date or modify it to a three-paragraph essay. If the student is really low ability, I may only require a solid paragraph. Likewise, I would challenge the brightest students to go deeper. I would make sure my students knew I believed in them and would build their confidence in their abilities. Proximity is huge in

classroom management; by constantly moving around the classroom, I could prompt my students to stay on task or to remind them of appropriate classroom behavior. This would be done very quietly and privately. I would also give a great deal of positive reinforcement while walking around and pointing out all of the things students are doing right. The positive messages must outnumber negative messages.

Linda Sparks • 1st Grade Teacher

John F. Kennedy School, Billerica, MA

Most of our classes are inclusion classes, with limited resources for additional help. At the beginning of the year, I go through all of the records, IEPs, and 504 plans and write down my questions, concerns, and specific information that will help the student. Next, we all meet as a team with the teachers from the previous year and specialists who work with the students. I have found this very helpful in setting up a plan for the students in my class. Then, I don't spend time re-evaluating students in areas where team members already know how students can be most successful. I am given the resources needed to start the year, and we continue to meet throughout the year as additional resources are needed. We are also fortunate to have a volunteer program through the senior center, parent community, and local businesses. These adult volunteers commit to a specific number of hours a week, are trained by school staff for specific skills the students will need help with, and begin to implement these skills with the students.

Cluster 6

Language Development, Language Diversity, and Immigrant Education



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Teachers' Casebook:

Communicating and Creating Community in the Classroom

What Would You Do?

You notice that students from different ethnic and linguistic groups seem to stick together in your classroom. When you ask students to select partners for projects, the divisions are usually on lines of ethnicity and language. You wonder if these students feel more comfortable tackling assignments with peers who share their

ethnic and cultural values. Language also creates a barrier between you and certain student groups. You want to communicate well and establish positive relationships with all your students. You also want to create a classroom climate in which students from diverse linguistic and cultural groups interact and learn with and from one another.

Critical Thinking

- How can you help students (and yourself) feel more comfortable with one another?
- What strategies might you use to support learning in English?
- How can you value students' heritage languages and help them maintain those languages?
- How will these issues affect you and your students in the particular grade level(s) you teach?

Overview and Objectives

All developed countries, and quite a few developing ones, are becoming more diverse. In thousands of classrooms, multiple languages are spoken. For many reasons, including unrest across the globe, families are immigrating to find a better, safer life—and their children will likely be in your classrooms. In this cluster, we look at how the over 7,000 natural languages in the world developed, the role of culture, the stages in language development, and the emergence of literacy. Next we consider diversity in language development and dual language development. But language diversity is more than bilingualism. Because all of us speak at least one dialect, we examine what teachers need to know about dialects and genderlects—a new term for me (Anita in this cluster)—along with the role of schools in second- (or third-) language learning. Finally, we turn to the critical issue for you—how to become a capable and confident teacher of immigrant students and English learners. What is the role of bilingual education, English immersion, and sheltered instruction? Do the emotions and concerns of these students affect their learning? How can you identify students who are English learners with special talents or special needs? By the time you have completed this cluster, you should be able to:

6.1 Understand how language develops and know how to support emergent literacy.

6.2 Discuss what happens when children develop two languages, including the roles of basic face-to-face communication and academic language.

6.3 Address whether dialect differences affect learning and discuss what teachers can do.

6.4 Compare and contrast immigrant and refugee students, including their learning characteristics and needs.

6.5 Describe Generation 1.5 students and teaching methods for English learners, including English immersion, bilingual instruction, and sheltered instruction. Explain the affective considerations, including trauma, that can impact these students and how family involvement can help.

6.6 Discuss how teachers can recognize special learning needs and talents when they do not speak their students' first languages.

OUTLINE

Teachers' Casebook—Communicating and Creating Community in the Classroom: What Would You Do?
Overview and Objectives

MODULE 20: Language Development, Emergent Literacy, and Language Diversity
The Development of Language
- What Develops? Language and Cultural Differences
- When and How Does Language Develop?
- Emergent Literacy
- Emergent Literacy and Language Diversity

Diversity in Language Development
- Dual-Language Development
- Signed Languages
- What Is Involved in Being Bilingual?
- Basic Communication and Academic Language

Dialect Differences in the Classroom
- Dialects
- Genderlects

MODULE 21: Teaching English Learners
Teaching Immigrant Students and English Learners
- Immigrants and Refugees
- Classrooms Today
- Four Student Profiles

Generation 1.5: Students in Two Worlds
- Bilingual Education and English Learners
- Sheltered Instruction
- Affective and Emotional/Social Considerations
- Working with Families: Using the Tools of the Culture

Special Challenges: Students Who Are English Learners with Unique Learning Needs and Gifts
- Students Who Are English Learners with Disabilities
- Reaching Every Student: Recognizing Giftedness in Bilingual Students

Cluster 6 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Communicating and Creating Community in the Classroom: What Would They Do?

MODULE 20 Language Development, Emergent Literacy, and Language Diversity

Learning Objective 6.1 Understand how language develops and know how to support emergent literacy.

Learning Objective 6.2 Discuss what happens when children develop two languages, including the roles of basic face-to-face communication and academic language.

Learning Objective 6.3 Address whether dialect differences affect learning and discuss what teachers can do.

The Development of Language

More than 7,000 languages are spoken in the world, with 225 living languages in the United States; 195 of these languages are indigenous—Native America (S. R. Anderson, 2010; Eberhard et al., 2020). Some languages around the world include tones, clicks, whistles, or other sounds to communicate meaning. For example, in Chinese or Navajo, the same word said with a different tone has a different meaning. Yet all children in every country and culture master the complicated system of their native language unless severe deprivation or physical problems interfere. This knowledge is remarkable. To have a conversation, children must coordinate sounds, meanings, words and sequences of words, volume, voice tone, inflection, and turn-taking rules and then link their remarks to what the communication partner just said. Yet, by about age 4, most children have a vocabulary of thousands of words, knowledge of grammar, and a grasp of rules for basic conversations (Colledge et al., 2002; Owens, 2020).

What Develops? Language and Cultural Differences

In general, cultures develop words for the concepts that are important to them. For example, how many different shades of green can you name? Mint, olive, emerald, teal, sea foam, turquoise, chartreuse, lime, apple… and visual artists can add cobalt titanate green, cinnabar green, phthalo yellow green, viridian green, and many others. English-speaking countries have more than 3,000 words for colors. In contrast, the Himba people of Namibia and a tribe of hunter-gatherer people in Papua New Guinea who speak Berinmo have five words for colors even though they can recognize many color variations. But whether the terms for color are few or many, children gradually acquire the color categories appropriate for their culture (Roberson et al., 2004).

Languages change over time to reflect changing cultural needs and values. The Shoshoni Native Americans have one word that means "to make a crunching sound walking on the sand." This word was valuable in the past to communicate about hunting, but today new words describing technical tools have been added to the Shoshoni language, as the group's life moves away from nomadic hunting. To hear hundreds of new 21st-century tool words, listen to techies talk about computers or video games (Price & Crapo, 2002).

THE PUZZLE OF LANGUAGE. How can infants around the world master so many varied languages? Children in different countries and cultures reach language milestones at about the same ages. Even deaf children not exposed to sign language systems have invented their own languages. Is there a biological, inborn human capacity for language learning? Many factors—biological, cultural, and experiential—play a role in language development. To master a language, children must be able to (a) read the intentions of others so they can acquire the *words*, *phrases*, and *concepts* of their language and also (b) find patterns in the ways other people use these words and phrases to construct the *grammar* of their language (Tomasello, 2006). The important point is that children learn language as they develop other cognitive abilities by actively trying to make sense of what they hear and by looking for patterns and making up rules to put together the jigsaw puzzle of language.

In this process, humans may have built-in biases, rules, grammars, and constraints about language that restrict the number of possibilities considered. For example, young

children seem to have a constraint specifying that a new label refers to a whole object, not just a part. Another built-in bias leads children to assume that the label refers to a class of similar objects. So the child learning about rabbits is equipped naturally to assume that "rabbit" refers to the whole animal (not just its ears) and that other, similar-looking animals are also rabbits (Jaswal & Markman, 2001; Markman, 1992). Humans are set up to learn language, but guidance from the environment plays a role as well—in terms of experience, practice, feedback, reward, and imitation. That is why your authors speak English and not Urdu (Owens, 2020; Waxman & Lidz, 2006).

When and How Does Language Develop?

Infants are born ready to learn any of the thousands of languages spoken throughout the world. Newborns prefer the sounds of languages that are rhythmically similar to the ones they heard while still in the womb. At birth, they prefer the sounds of speech over other kinds of sounds. Their brains use distinct systems to process language. Infants can discriminate nearly every *phonetic* (speech sound) contrast, even those they have not heard before. That means distinguishing among about 600 consonant and 200 vowel sounds. However, babies quickly begin to focus on and practice the speech sounds they hear in their environment and by about 14 months are no longer able to distinguish sounds in all the world's languages (Owens, 2020; Werker, 2018; Werker & Ward, 2018). This early selection, referred to as "perceptual narrowing," does not happen as quickly for bilingual babies as it does for babies in a monolingual environment. Bilingual babies remain more open, or "cognitively flexible," with regard to the sounds from different languages (Kuhl, cited in Klass, 2011).

Two processes that support early language development are common in adult–child interactions: *joint attention* and *child-directed speech*. Joint attention occurs when a child and a caregiver or teacher attend to the same object or event at the same time. Often the caregiver will point to, describe, label, or ask questions about the object or event. Such interactions promote sustained attention on the part of the infant/child, better comprehension, and faster vocabulary development (Flom & Pick, 2003; Silvén, 2001). Child-directed speech (CDS) refers to a form of language characterized by short sentences and many questions with simple constructions delivered in higher-pitched, exaggerated tones (Snow, 1977). Sometimes referred to as *motherese* or baby talk, this form of speech is evident when adults interact with infants across a variety of cultures. Even children use CDS to speak to infants and toddlers younger than themselves (Yont et al., 2003). Child-directed speech promotes joint attention and turn-taking and shows that adults are responsive to the language-learning needs of children (Cameron-Faulkner et al., 2003).

Table 6.1 shows the milestones of children's language development, ages 2 to 6, in Western cultures, along with ideas for encouraging this development.

SOUNDS AND PRONUNCIATION. By about age 5, most children have mastered the sounds of their native language, but a few sounds may remain unconquered. You saw in Cluster 5 that the sounds of the consonants *l, r, y, s, n, v,* and *z* and the consonant blends *sh, ch, ng, zh,* and *th* are the last to be mastered (Friend, 2018). Young children may understand and be able to use many words but prefer to use the words they can pronounce easily. As children learn to hear differences in the sounds of language, they enjoy rhymes, songs, and general sound silliness. The young son of a friend of ours wanted to name his new baby sister Brontosaurus "just because it's fun to say."

Expressive vocabulary
All the different words a person uses in speaking or writing.

Receptive vocabulary
The words a person can understand in spoken or written words.

VOCABULARY AND MEANING. As you can see in Table 6.1, children between ages 2 and 3 can use about 450 words (**expressive vocabulary**) even though they can understand many more (**receptive vocabulary**). By age 6, children's expressive vocabularies will grow to about 2,600 words, and their receptive vocabularies will be an impressive 20,000-plus words (Otto, 2010). Some researchers estimate that students in the early grades learn up to 20 words a day (Bloom, 2002). In the early elementary years, some children may have trouble with abstract words such as *justice* or *economy*. They also might not understand the subjunctive case ("If I were a butterfly") because they lack the cognitive ability to reason about things that are not true ("But you aren't a butterfly"). They may interpret all statements literally and thus misunderstand sarcasm or metaphor. For example, fables are understood only as stories instead of as moral

Table 6.1 Milestones in Early Childhood Language and Ways to Encourage Development

AGE RANGE	MILESTONE	STRATEGIES TO ENCOURAGE DEVELOPMENT
Between 2 and 3	Identifies body parts; calls self "me" instead of name; combines nouns and verbs; has a 450-word vocabulary; uses short sentences; matches 3–4 colors; knows *big* and *little;* likes to hear same story repeated; forms some plurals; answers "where" questions	• Help the child listen and follow instructions by playing simple games • Repeat new words over and over • Describe what you are doing, planning, thinking • Have the child deliver simple messages for you • Show the child you understand what he or she says by answering, smiling, and nodding your head • Expand what the child says. Child: "more juice." You say, "You want more juice?"
Between 3 and 4	Can tell a story; sentence length of 4–5 words; vocabulary about 1,000 words; knows last name, name of street, several nursery rhymes	• Talk about how objects are the same or different • Help the child to tell stories using books and pictures • Encourage play with other children • Talk about places you've been or will be going
Between 4 and 5	Sentence length of 4–5 words; uses past tense; vocabulary of about 1,500 words; identifies colors, shapes; asks many questions like "why?" and "who?"	• Help the child sort objects and things (e.g., things to eat, animals) • Let the child help you plan activities • Continue talking about the child's interests • Let the child tell and make up stories
Between 5 and 6	Sentence length of 5–6 words; average 6-year-old has vocabulary of over 2,000 words; defines objects by their use; knows spatial relations (like "on top" and "far") and opposites; knows address; understands *same* and *different;* uses all types of sentences	• Praise children when they talk about feelings, thoughts, hopes, fears • Sing songs, rhymes • Talk with them as you would an adult
At Every Age		• Listen and show your pleasure when the child talks to you • Carry on conversations with the child • Ask questions to get the child to think and talk • Read books to the child every day, increasing in length as the child develops

Source: Reprinted from http://www.ldonline.org, with thanks to the Learning Disabilities Association of America.

lessons. Many children are in their preadolescent years before they are able to distinguish being kidded from being taunted or before they know that a sarcastic remark is not meant to be taken literally. But by adolescence, students are able to use their developing cognitive abilities to learn abstract word meanings and to use poetic, figurative language (Owens, 2020).

Young children begin to elaborate their simple language by adding plurals; endings for verbs such as *-ed* and *-ing*; short words like *and, but*, and *in*; articles (*a, the*); and possessives (*the girl's hair*). A classic study by Jean Berko (1958) demonstrated that children could even apply these rules to make nonsense words into plural, possessive, or past tense forms. For example, when shown a picture of a single "wug," the preschool children in the study could answer correctly, "wugs" when the researcher said, "Now there is another one. There are two of them. There are two _____." In the process of figuring out the rules governing these aspects of language, children make some very interesting mistakes.

GRAMMAR AND SYNTAX. For a brief time, children may use irregular forms of particular words properly, as if they are saying what they have heard. Then, as they begin to learn rules, they **overregularize** words by applying the rules to everything. Children who once said, "Our car is broken" begin to insist, "Our car is broked." A child who once talked about her *feet* might discover the *-s* for plurals and refer to her *foots* or *feets* and then learn about *-es* for plurals (*horses, kisses*) and describe her *footses* before she finally returns to talking about her *feet* (Flavell et al., 2002). Parents often wonder why their child seems to be regressing. Actually, these "mistakes" show how logical and rational children can be as they try to assimilate new words into existing schemes. Apparently these overregularizations happen in all languages, including American Sign Language. According to Joshua Hartshore and Michael Ullman (2006), girls tend to overregularize verb tenses more than boys, so girls are more likely to say, "holded" instead of "held." The researchers speculate that because girls have better memory for words, they have better access to similar words (*folded, scolded*) and generalize to *holded*.

Overregularize
To apply a rule of syntax or grammar in situations when the rule does not apply, for example, saying, "The bike was broked."

Early on, children master the basics of **syntax** (word order) in their native language, but overregularizing plays a role in mastering syntax, too. For example, because the usual order in English is subject–verb–object, preschoolers just mastering the rules of language have trouble with sentences in any other order. If 4-year-old Justin hears a statement in the passive voice, like "The truck was bumped by the car," he probably thinks the truck did the bumping to the car because "truck" came first in the sentence. Interestingly, however, in languages where the passive voice is more important, such as the South African language Sesotho, children use this construction much earlier, as young as 3 or 4 (Demuth, 1990). So, when talking with young children, in English at least, using direct language is generally better. By early elementary school, many children can understand the meaning of passive sentences, but they do not use such constructions in their normal conversations unless the passive construction is common in their culture.

Syntax
The order of words in phrases or sentences.

PRAGMATICS: USING LANGUAGE IN SOCIAL SITUATIONS. **Pragmatics** involves the appropriate use of language to communicate in social situations—how to enter a conversation, tell a joke, interrupt, keep a conversation going, or adjust your language for the listener. Children show their understanding of pragmatics when they talk in simple sentences to younger children or command their pets to "Come here!" in louder, deeper voices or provide more detail when describing an event to a parent who was absent from the event (Flavell et al., 2002). So even young children seem quite able to fit their language to the situation, at least with familiar people.

Pragmatics
The rules for when and how to use language to be an effective communicator in a particular culture.

Rules for the appropriate use of language vary across cultures. For example, in a classic study of two working-class communities in the United States, Shirley Brice Heath (1989) spent many hours observing in the homes of White families and Black families. She found that the adults asked different kinds of questions and encouraged different kinds of "talk" in the two groups: White adults asked test-like questions with right answers, such as "How many cars are there?" or "Which car is bigger?" These questions seemed odd to Black children, whose families don't ask about what they already know. The Black child might wonder, "Why would my aunt ask me how many cars? She can see there are 3." Instead, Black families encouraged rich storytelling and also teasing that honed their children's quick wit and assertive responses.

In Indigenous families, language and culture are inextricably linked—cultural knowledge is transmitted from one generation to another through language. Knowledge about ecosystems, plant life and animal behavior, methods of conservation, and other understandings of the natural world are embedded in languages of Native Americans. For example, there are words and concepts in the Hawaiian language that serve to protect and conserve tree snails—creatures that now are almost extinct. As the language is lost, so are the snails, and the ecosystem suffers (LaPier, 2018).

METALINGUISTIC AWARENESS. Around the age of 5, students begin to develop **metalinguistic awareness**. This means their understanding about language how it works becomes explicit. They now have knowledge about language itself. They are ready to study and

Metalinguistic awareness
Understanding one's own use of language.

extend their vocabulary, grammar, and other rules that have been implicit—understood but not consciously expressed. This process continues throughout life, as we all become better able to use language. Learning to read and write, which begins with *emergent literacy*, encourages metalinguistic awareness.

Emergent Literacy

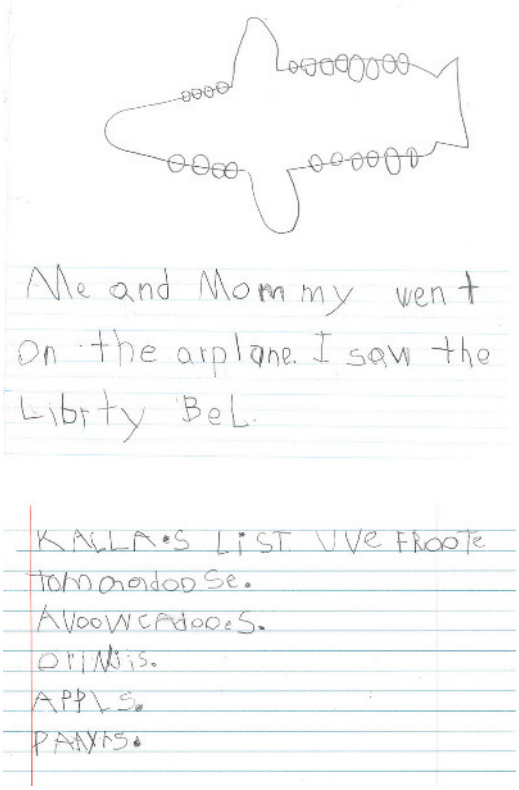
Today, in most languages, reading is a cornerstone of learning, and the foundation for reading is built in early childhood. Early knowledge and skills related to reading often are referred to as **emergent literacy**. Figure 6.1 shows Kalla's emerging literacy skills just after she turned six.

Emergent literacy
The skills and knowledge, usually developed in the preschool years, that are the foundation for the development of reading and writing.

What are the most important skills that help literacy emerge? Research has identified two broad categories of skills that are important for later reading: (a) skills related to understanding sounds and codes, such as knowing that letters have names, that sounds are associated with letters, and that words are made up of sounds; and (b) oral language skills such as expressive and receptive vocabulary, knowledge of syntax, and the ability to understand and tell stories (Connor et al., 2014; Douglas & Albro, 2014; Florit & Cain, 2011). Children need both. For example, when reading a story, to understand even a simple sentence such as, "She ordered an e-book from Amazon?" the reader must know about letters, sounds, grammar, and punctuation. But these decoding skills are not enough. To understand, the reader needs oral language skills and knowledge such as: What is an e-book? What does it mean to *order*? Is this the Amazon River or Amazon online? Why the question mark? Who is asking? How does this sentence fit the context of the story?

Some educators emphasize decoding skills, others stress oral language, but a study by the National Institute of Child Health and Human Development (NICHD) Early Child Care (2005b) followed more than 1,000 children from age 3 through grade 3 and found that oral language skills at age 4½ predicted word decoding in grade 1 and reading comprehension in grade 3. The NICHD researchers concluded, "Most recent investigations find that preschool oral language skills [for example, size of vocabulary, ability to use syntax, ability to understand and tell stories] play an important role alongside code skills in predicting reading in the transition to school" (p. 439). Because this was not an experimental design (see Cluster 1), we cannot be sure that early decoding and oral language skills caused later reading achievement. But the results of this study suggest that decoding and oral language skills are likely key parts of the puzzle; these skills often support each other. So *beware of either/or choices* between decoding *or* oral language—both are important.

Figure 6.1 **A Story and a Grocery List**
This child knows quite a bit about reading and writing—letters make words that communicate meaning, writing goes from left to right, lists go down the page, and stories look different than shopping lists. Emergent writing samples provided by Kalla Terpenning, who just turned 6.



Source: *Woolfolk, A., & Perry, N.E. (2015). Child and Adolescent Development. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., Upper Saddle River, New Jersey.*

BUILDING A FOUNDATION. What builds this foundation of emergent literacy skills? Two related activities are critical: (a) conversations with adults that develop knowledge about language and (b) joint reading, using books as supports for talking about sounds, words, pictures, and concepts (National Institute of Child Health and Human Development, 2005a). Especially in the early years, children's home experiences are central in the development of language and literacy (Lonigan et al., 2013; Sénéchal & LeFevre, 2002). In homes that promote literacy, parents and other adults value reading as a source of pleasure, and books and other printed materials are everywhere. Parents read to their children; take them to bookstores and libraries; limit the amount of television, other media, and screen time on digital devices; and encourage literacy-related play such as setting up a pretend school or writing "letters" (Pressley, 1996; Snow, 1993; Whitehurst et al., 1994). Childcare workers and teachers can help. In a study that followed almost 300 low-income children

from kindergarten to grade 5, researchers found that the more families were involved with the school, the better their children's literacy development. School involvement was especially valuable when the parents had less education themselves (Dearing et al., 2006).

For older students, literacy instruction emphasizes reading and writing for understanding. As reading materials become more complex (think fiction, poetry, and many academic subjects) and varied (think Web searches, Wikipedia, visual information, and traditional texts), reading for understanding becomes more demanding. Students must connect what they read to their existing content knowledge, build vocabulary, draw conclusions, make inferences and predictions, detect patterns and themes, write about what they understand, make claims, provide evidence.... The list goes on. Research teams around the country continue to test models for developing these complex literacy skills for older students (Connor et al., 2014; Douglas & Albro, 2014; Fogarty et al., 2014).

WHEN PROBLEMS PERSIST. Not all children come to first grade with a firm foundation for literacy, and even some students who had rich literacy experiences in preschool and kindergarten find learning to read a challenge. Direct teaching of specific reading skills can help many students "crack the code" and move forward. But for some students, reading problems persist into middle and high school (Wanzek et al., 2013). For example, results of the National Assessment of Educational Progress indicated that one in three fourth-graders and one in four eighth-graders could not understand what they read in materials at their grade level (Dougals & Albro, 2014).

For those who struggle, direct and intensive teaching programs might improve reading skills for some students, but there is an important additional consideration—*continued support is needed*. Even good interventions lasting many months are not magic bullets that change poor readers into good readers for the rest of their lives. For example, Blachman and her colleagues (2014) followed 58 students who participated in an intensive reading intervention program in second or third grade. The students had individual tutoring 50 minutes a day, 5 days a week, for 8 months. More than a decade later, when these students were 18 to 22 years old, the researchers found only small to moderate differences in reading and spelling skills for this group compared to similar students who had not participated in the intensive reading intervention. For students with persistent reading problems, we should think of reading intervention as being more like "insulin therapy, rather than as an inoculation against further reading failure" (Blachman et al., 2014, p. 10). Like people who need insulin on an ongoing basis to be healthy, struggling readers need ongoing teaching and support in reading—you can't "fix it and forget it."

Emergent Literacy and Language Diversity

Decoding and oral language skills are critical for literacy regardless of the child's language or languages (Hammer, Farkas, & Maczuga, 2010). But does emergent literacy "emerge" the same way in languages other than English—the language in which much of the research has taken place? Language differences do exist—read on!

LANGUAGES AND EMERGENT LITERACY. English is not an easy language to learn. The same letter can have different pronunciations. (How many ways can you pronounce "c"? Think "cook" and "city" for openers.) In addition, the same sound can be written different ways, and irregular spellings are plentiful. It makes sense that children would have to become quick and automatic in decoding this complicated system in English before they could devote their mental resources to comprehension. But when languages have more transparent letter–sound systems (e.g., Spanish, German, Italian, and Finnish)—when the letters and the sounds have consistent, predictable connections and few exceptions or irregular spellings—then decoding skills develop more easily, and early schooling in those languages can place less emphasis on decoding and focus more on comprehension (Florit & Cain, 2011; Goldenberg et al., 2014).

Put Yourself in Their Place Imagine you are a young Mexican American child, Josué González (2011). One of your fondest memories is of your grandmother reading to you in Spanish night after night—a wonderful, romantic book about the beautiful young Genoveva who lived in a mythical kingdom. It was an exciting tale filled with love, deception, an evil satyr, Genoveva abandoned in the forest to die, and a happy reunion at the end. In school, to learn to read in English, you are given the *Dick and Jane* basal readers, where you read gripping dialogue like "Look, look Jane. See Spot run. Come Spot come." By the third grade there is still no plot and certainly no Genoveva. How excited would you be about reading in English?

BILINGUAL EMERGENT LITERACY. Most school programs in the United States expect all children to learn to read in English, even if it has to be *Dick and Jane*. According to research by Carol Hammer and her colleagues, this emphasis on reading only in English may not be necessary. In fact, one key factor may facilitate literacy development—growth in receptive language. Recall that *receptive* vocabulary includes the words and language structures you understand even if you do not use them in your *expressive* vocabulary, the words and structures you actually use when you talk.

In one study, Hammer followed 88 children for 2 years in a Head Start program (Hammer et al., 2007). The mothers of all the children spoke the Puerto Rican dialect of Spanish. There were two groups of students—those who had been expected to speak both English and Spanish from birth and those who were not expected to learn English until they began Head Start at age 3. The researchers found that it was not a particular score on any test but instead *growth in receptive language* in general that predicted early reading outcomes—and it did not matter whether the students spoke English and Spanish from birth or if they started speaking English when they began attending school. Hammer and colleagues concluded, "Growth in children's English receptive language abilities during Head Start, as opposed to the level of English they had achieved by the end of Head Start, positively predicted the children's emergent reading abilities in English and the children's ability to identify letters and words in English" (p. 243). In addition, growth in Spanish-language abilities predicted reading performance in Spanish as well as in English.

One implication is that teachers and parents should focus on continuing language development and not worry about rushing children into speaking English exclusively. As long as children are progressing in their language development, in either their native language or English, they will have positive early literacy outcomes. These findings are consistent with the recommendations of the Society for Research in Child Development (SRCD): "Investing in dual-language instead of English-only programs and encouraging pre-kindergarten attendance can improve learning opportunities for Hispanic children and increase their chances of success" (SRCD, 2009, p. 1). The *Guidelines: Supporting Language and Promoting Literacy* give some ideas for supporting the language development of all your students.

GUIDELINES

Supporting Language and Promoting Literacy

FOR TEACHERS

Use stories as a springboard for conversations.

Examples

1. Retell stories you have read with your students.
2. Talk about the words, activities, and objects in the books. Do the students have anything like these in their homes or classrooms?

Identify and build on strengths the families already have (Delpit, 2003).

Examples

1. What are the histories, stories, and skills of family members? Students can draw or write about these.
2. Show respect for the student's language by celebrating poems or songs from the language.

(*Continued*)

Provide home activities to be shared with family members.

Examples

1. Encourage family members to work with children to read and follow simple recipes, play language games, keep diaries or journals for the family, and visit the library. Get feedback from families or students about the activities.
2. Give families feedback sheets, and ask them to help evaluate the child's schoolwork.
3. Provide lists of good children's literature available locally—work with libraries, clubs, and faith-based communities to identify sources.

FOR SCHOOL COUNSELORS AND ADMINISTRATORS

Communicate with families about the goals and activities of your program.

Examples

1. Have someone from the school district, the community, or even an older student translate into the language of the child's family any material you plan to send home.
2. At the beginning of school, send home a description of the goals to be achieved in your classes—make sure it is in a clear and readable format.
3. As you start each unit, send home a newsletter describing what students will be studying—give suggestions for home activities that support the learning.

Involve families in decisions about curriculum.

Examples

1. Have planning workshops at times family members can attend—provide childcare for younger siblings, but let children and families work together on projects.
2. Invite parents to come to class to read to students, take dictation of stories, tell stories, record or bind books, and demonstrate skills.

Make it easier for families to come to school.

Examples

1. Provide babysitting for younger children while families meet with teachers.
2. Consider the transportation needs of families—can they get to school?

For more information on family literacy partnerships, see http://www.familieslearning.org/interactive_tools/what_works.

Source: Hulit, L. M., & Howard, M. R., *Born to talk: An introduction to speech and language development* (4th ed.). © 2006; Hulit, L. M., Fahey, K. R., & Howard, M. R., *Born to talk: An introduction to speech and language development* (6th ed.) © 2015. Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

Connect and Extend to PRAXIS II®

Bilingual Issues (IV, B4)

Identify the major issues related to the debate over bilingual education. Explain the major approaches to bilingual education, and describe steps that a teacher can take to promote the learning and language acquisition of non–English-speaking students.

Bilingual

Speaking two languages and dealing appropriately with the two different cultures.

Monolingual

Speaking only one language.

Diversity in Language Development

Many children learn two or more languages simultaneously while they are growing up. What does this involve, and are there benefits?

Dual-Language Development

More than half of the world's population is **bilingual** (speaks two languages), and many people speak multiple languages (Agulló & Herrero, 2019). If they are exposed to two languages from birth, bilingual children reach the language milestones in both languages on the same schedule as **monolingual** children (children learning only one language). Initially, bilingual children might have a larger vocabulary in the language that they are learning from the person with whom they spend the most time or have the closest bond, so a child who stays home all day with a Chinese-speaking parent will likely use more Chinese words. But over time, these children can become fully and equally bilingual if the dual-language exposure (a) begins early in life (before age 5); (b) occurs across a wide and rich range of contexts; and (c) is systematic, consistent, and sustained in the home and

community (Petitto, 2009; Rojas & Iglesias, 2013). Another requirement is that the second language must provide more than 25% of the child's language input; with less exposure, the child is unlikely to learn the second language (Pearson et al., 1997; Topping et al., 2011). Bilingual children may mix vocabularies of the two languages when they speak, but this is not necessarily a sign that they are confused because their bilingual parents often intentionally mix vocabularies as well, selecting the word that best expresses their intent (Diaz-Rico, 2018). So, with consistent and sustained engagement in two languages, children can be fully bilingual.

Research on the brain and bilingualism shows that people who learn two languages before about age 5 process both languages in the same way as those who learn only one language and use the same parts of their brains, usually in the left hemisphere (Klein et al., 2014). In contrast, people who learn a second language later have to use both hemispheres of their brain as well as the frontal lobe and working memory. They have to apply more cognitive effort.

SECOND-LANGUAGE LEARNING. What if you didn't learn two languages as you were growing up? When and how should you learn a second language? To answer that question, you have to remember the distinction between **critical periods** for learning (if learning doesn't happen then, it never will) and **sensitive periods**, times when we are especially responsive to learning. There is no critical period that limits the possibility of language learning by adults (Marinova-Todd et al., 2000). In fact, older children go through the stages of language learning faster than young children. Adults have more learning strategies and greater knowledge of language in general to use when mastering a second language (Diaz-Rico, 2018). But research on the brain and bilingualism suggests "*there is most definitely a 'sensitive period' for optimal bilingual language and reading exposure and mastery*. Age of first bilingual exposure predicts how strong a reader a bilingual child can and will become in each of their two languages" (Petitto, 2009, p. 192).

Critical periods
If learning doesn't happen during these periods, it never will.

Sensitive periods
Times when a person is especially ready to learn certain things or is responsive to certain experiences.

Even though there is no *critical* period for learning a language, there appears to be a critical period for learning language pronunciation. The earlier people learn a second language, the more their pronunciation is near native. Remember that for about the first 12 months, infants can discriminate all the basic sound building blocks from any of the world's 7,000 or so languages. But after about 14 months they lose this capability and hone in on the sounds of the language they are learning. For children learning two languages at once, however, this developmental window seems to stay open longer, which means that these children can continue to differentiate sounds past 14 months (Petitto, 2009; Werker, 2018).

After adolescence, it is almost impossible to learn a new language without speaking with an accent. But even if a child just overhears a language without actually learning it formally, this overhearing can improve later learning (Au et al., 2002). So the best time to acquire two languages on your own through exposure (and to learn native pronunciation for both languages) is early childhood (Berger, 2020). But accented or not, speaking multiple languages has many benefits—read on!

BENEFITS OF BILINGUALISM. There is no cognitive penalty for children who add a second or third language. In fact, there are benefits. Higher degrees of bilingualism are correlated with increased cognitive abilities in such areas as concept formation, creativity, theory of mind, understanding the perspectives of others, cognitive flexibility, attention and executive functioning, phoneme awareness, and understanding that printed words are symbols for language (Bialystok, 2018; Byers-Heinlein & Lew-Williams, 2013; Kempert, et al., 2011). In addition, bilingual children have more advanced *metalinguistic* understanding of how language works; for example, they are more likely to notice grammar errors. Even more impressive, children from monolingual English-speaking families who attended bilingual schools and learned Spanish had better phoneme awareness and reading comprehension than their peers who were educated in an English-only program. In addition, speaking two

languages is an asset when graduates enter the business world. Some researchers believe that speaking two languages may even provide some protection against Alzheimer's dementia in old age (Berger, 2020). Maybe humans evolved to speak multiple languages because this would have survival value, so perhaps the "contemporary pockets of civilization where one language is spoken are the aberrant deviation; in other words, perhaps our brains were neurologically set to be multilingual" (Petitto & Kovelman, 2003, p. 14).

LANGUAGE LOSS. About 40% of the 7,000 languages in the world have fewer than 1,000 speakers remaining. In North America before the Europeans and Asians arrived, there were more than 300 languages spoken by the Native peoples. Today, 99% of the remaining Native American languages in the United States are in danger of extinction because only 34 of these languages have more than 1,000 speakers (S. R. Anderson, 2010; Eberhard et al., 2020).

But language loss is not only historical; it's also personal. For years, many schools discouraged and even punished students for speaking languages other than English. For example, Ricky Duvall grew up speaking his heritage language, Cherokee, like his mom, grandparents, siblings, and cousins. **Heritage language** is the language spoken in a student's home or by older relatives while the larger society outside the home speaks a different language. When Ricky entered kindergarten, he had to stay in at recess if he spoke Cherokee in school. He worked so hard to use English all the time that he lost his heritage language altogether (Nagle, 2019). But Ricky may have retained his accent. Some linguists believe that for Native Americans, speaking English with a distinct "reservation" accent is a way of claiming and maintaining their identity. Remarkably, this accent is shared by many Native Americans, even those who are from different states and tribes (Ahtone, 2017).

Heritage language
The language spoken in the student's home or by members of the student's family.

If you mastered your own first language and then added a second or third language, you are an example of *additive bilingualism*—you kept your first language as you added another. But if you, like Ricky, experienced discrimination against your first language, you may have left that language behind as you gained proficiency in a new language—an example of *subtractive bilingualism* (Hamers & Blanc, 2000; Montrul, 2010; Norbert, 2005). Immigrants and indigenous people are more likely to experience discrimination and therefore "subtract" their first language. But if family members and the community, including the school, value and use a child's first language, that child is more likely to keep that language when a second one is learned.

Even though the advantages of bilingualism described earlier seem clear, many children and adults are examples of subtractive bilingualism—they are losing their heritage language (Montrul, 2010). Often these students were born in a new country after their parents or grandparents immigrated, so the students never lived in the country where everyone spoke their heritage language. A Chinese American college student interviewed by K. F. Wong and Xiao (2010) expressed concerns this way:

> My heritage language is definitely Toishan (Taishan), but even so, my parents don't always speak it fluently, so… I know somewhere down the line, I'm probably the last one to even speak it… and I feel like it is not my heritage anymore. (p. 165)

Balanced bilingualism
Adding a second language capability without losing your heritage language.

Rather than losing one language to gain another, the goal should be **balanced bilingualism**—equal fluency in both languages (V. Gonzalez, 1999). The first language may be the only way a child can communicate with parents, grandparents, and other family members. This language is the main channel for transmitting family values, histories, and traditions and is the basis for identity and self-esteem (Peregoy & Boyle, 2017). But outside their homes, English connects these students to academic, social, and economic opportunities, so both languages are invaluable (Borrero & Yeh, 2010).

In many countries there are special schools that focus on instruction in heritage languages and cultures. Students participate in these schools in the afternoon, on the weekend, or during the summer in addition to attending their regular public school. In Great Britain, these institutions are called *supplementary* or *complementary* schools. In Australia, they are

called *community language* or *ethnic schools*. In the United States and Canada, the name often is *heritage language schools* (Creese, 2009). Here are some ideas for learning about heritage schools in your area:

- Find out which complementary/heritage schools are located in your area, and make contact with them.
- Attend the awards ceremonies and presentations of your students who attend complementary/heritage schools. Show your commitment to their bilingual and multicultural projects.
- Identify teachers who work in both the complementary/heritage and the mainstream school sectors. Ask them to create professional development workshops for your school.
- Ask a lead teacher of a complementary/heritage school to speak at an assembly.
- Encourage small-scale research and/or practical projects to harness the potential links between complementary and mainstream schooling (Creese, 2009, p. 272).

Signed Languages

People who can communicate in both a spoken and a signed language or in two different signed languages are considered bilingual (Petitto, 2009). There are several other parallels between spoken languages and the many signed languages used around the world, such as American Sign Language (ASL), Signed English (United States, Ireland, New Zealand, Australia, Great Britain), Lengua de señas nicaragüense (Nicaraguan Sign Language), Warlpiri Sign Language (Australia Aboriginal), and Langue des Signes Quebecoise (LSQ), or Quebec Sign Language. Each of these languages is distinct and not simply a derived version of a spoken language. For example, American Sign Language is not a direct translation of English and has its own grammatical structure. People using Quebec Sign Language and French Sign Language cannot understand each other—even though the French spoken language is common to both countries—because each of these signed languages is distinct.

Both spoken and signed languages have large vocabularies and complex grammars. The same mechanisms for language acquisition are used for both spoken and signed languages (Petitto & Kovelman, 2003). In addition, the milestones for signed language are the same as for spoken language. For example, children "say" their first words at about the same time, around 12 months, with both spoken and signed languages (Bloom, 2002). In fact, research with children learning a signed and a spoken language from infancy demonstrates that "being exposed to two languages from birth—and, in particular, being exposed to a signed and a spoken language from birth—does not cause a child to be language delayed or confused" (Petitto & Kovelman, 2003, p. 16). As with two spoken languages, children can become balanced bilinguals in a spoken and a signed language.

What Is Involved in Being Bilingual?

About 58.3 million people in the United States can speak Spanish today. By 2050, the estimates are that the United States will have the largest number of Spanish speakers of any country in the world—about 138 million (Ethnologue, 2020; Perez, 2015). Since 1980, the number of Chinese immigrants in the United States has increased sevenfold, to almost 2.5 million in 2018 (Echeverria-Estrada & Batalova, 2020). With these increased numbers come many misconceptions about bilingualism, as you can see in Table 6.2 on the next page.

What does it really mean to be bilingual? Some definitions of *bilingualism* focus exclusively on a language-based meaning: People who are bilingual speak two languages. But being bilingual also means mastering the knowledge necessary to communicate in two cultures and dealing with potential discrimination while still maintaining a sense of your own identity; so bilingualism requires biculturalism as well (Borrero & Yeh, 2010; Lee et al., 2008). Being a successful bilingual *student* has one more requirement—learning *academic language.*

Table 6.2 Myths and Misconceptions About Being Bilingual

In this table, L1 means the original language, and L2 means the second language.

MYTH	TRUTH
Learning a second language (L2) takes little time and effort, and "children just pick it up" when they are exposed to the language.	Learning English as a second language takes 2–3 years for oral proficiency and 6–9 years for academic language use. To learn L2, students need to have a reason to communicate, access to English speakers, interactions, support, feedback, and time.
All language skills (listening, speaking, reading, writing) transfer from L1 to L2.	Reading is the skill that transfers most readily.
Code switching is an indication of a language disorder.	Code switching indicates high-level language skills in both L1 and L2.
All bilinguals easily maintain both languages. Children do not lose their first language.	It takes great effort and attention to maintain high-level skills in both languages. Loss of L1 and underdevelopment of L2 (semilingual in L1 and L2) are problems for second language learners.
Learning two languages in early childhood will confuse or delay a child's acquisition of English.	Most young children throughout the world successfully learn more than one language from their earliest years. In fact, learning two languages benefits brain development.
To learn English successfully, students' parents need to speak only English at home.	Children need to use both languages in many contexts.
Reading in L1 is detrimental to learning English.	Literacy-rich environments in either L1 or L2 support development of necessary prereading skills.
Language disorders must be identified by tests in English.	Children must be tested in both L1 and L2 to determine language disorders.
What works for teaching any subject works to teach a second language—it's "just good teaching."	Special methods, strategies, and materials make teaching a second language much more effective.

Source: Based on Diaz-Rico, L. T. (2018). *Crosscultural, language, and academic development handbook: A complete K–12 reference guide* (6th ed.). Boston, MA: Pearson; Espinosa, L. M. (2008). *Challenging common myths about young English language learners*. New York, NY: Foundation for Child Development; and Ohio Department of Education (2014). *Myths about second language learning*. Columbus, OH: Ohio Department of Education.

Basic Communication and Academic Language

Proficiency in a second language has two separate aspects: face-to-face *basic communication/conversation skills* and *academic language* (Garcia, 2002; Herrell & Jordan, 2016). The stages for basic second-language learning are shown in Table 6.3. *Basic communication and conversation* skills include, for example, using appropriate vocabulary and sentences, asking and answering questions, starting and stopping conversations, listening, and understanding and using idioms. It takes about 2 to 3 years in a good-quality program for children who are learning a new language to be able to use *basic* language in conversations.

Academic language spans the entire range of language used in elementary and secondary schools and universities and includes having fluency in reading and writing; understanding grammar and syntax; knowing specialized vocabulary; following written and oral directions; collaborating with other students on assignments; understanding different types of texts and forms of writing such as fiction, poetry, math problems, science charts and graphs, and timelines in history; mastering study skills such as outlining, summarizing, and reading comprehension; and understanding abstract, higher-order, complex concepts. Academic language includes the general words and concepts used in many subjects such as *analyze, evaluate*, and *summarize* as well as words and strategies specific to disciplines such as *factor the equation* or *derivative* in math, a *factor* in the latest election results, or a *derivative* in finance. You can see how complicated this gets when the same word has two very different meanings in different fields! In fact, academic language should be considered a *new language* that people must learn in order to succeed in school. So all students, but especially

Academic language
The entire range of language used in elementary, secondary, and university-level schools, including words, concepts, strategies, and processes from academic subjects.

Table 6.3 Common Errors and Accomplishments as Students Learn a Second Language

LANGUAGE STAGE	COMMON ERRORS AND LIMITATIONS	ACCOMPLISHMENTS
During the first year of learning the language	• No speech at all • Understands only one word at a time • Mispronounces words • Leaves out words • One- or two-word responses • Relies heavily on context	• Uses pantomiming, gestures, pointing to communicate • Can use "yes," "no," or single words
During the second year of learning the language	• Basic pronunciation and grammar mistakes • Limited vocabulary	• Uses whole sentences • Good comprehension (in context) • Uses language to function well socially
During the third year and beyond of learning the language	• Some errors with complex grammar	• Can tell whole stories • Good comprehension • Beginning to understand and use academic language • Larger vocabulary

Source: Based on Miranda, T. Z. (2008). *Bilingual education for all students: Still standing after all these years*. In L. S. Verplaetse & N. Migliacci (Eds.), *Inclusive pedagogy for English language learners: A handbook of research-informed practices* (pp. 257–275). New York, NY: Erlbaum.

those who may not speak formal English at home, must become bilingual and bicultural in academic language; they must learn the new ways of speaking and cultural rules required for school (Echevarría et al., 2018a,b; Vogt & Echevarría, 2022).

You saw that mastering *basic* language and conversation takes up to 3 years. Mastering *academic* language skills such as reading texts in the new language takes much longer, 6 to 9 years or more, depending on how much academic knowledge the student already had in his or her native language. So, children who seem to "know" a second language in conversation can still have great difficulty with complex schoolwork in that language (Bialystok, 2018; Verplaetse & Migliacci, 2008). Here is how one tenth-grader from Mexico described how her teacher helped her master academic language:

> What I really love about my ESL teacher is that she explains how to organize our thoughts and how to write in school ways. She also teaches us what to do to be good, critical readers. That is so helpful in my other classes and I know it will be good for life. (Walqui, 2008, p. 111)

Cultural differences might interfere with developing academic English and content understanding. For example, many Asian students come from a culture that believes asking the teacher questions is rude and inappropriate because questioning implies that the teacher has done a poor job of instruction. In Asian classrooms, questioning might cause the teacher to lose face in front of the students—an entirely unacceptable situation. Thus, teachers need to ask themselves why their English learners are not asking questions. And class discussion may be considered a waste of time in cultures in which the teacher is viewed as the source of authoritative knowledge. How could students possibly learn anything from other students who are not authorities? Or perhaps they like to learn from peers but in smaller groups. So beliefs about learning shaped by culture and previous experiences in different kinds of classrooms may explain why English learners seem quiet and reluctant to speak in class. English learners also might strongly prefer memorization as a learning strategy if memorization was emphasized in their previous schools. (Thanks to Dr. Alan Hirvela at Ohio State University for pointing out these possible cultural differences in beliefs about schools and teachers.) The *Guidelines: Promoting Language Learning* on the next page give ideas for promoting language learning, but you should also keep cultural differences in mind as you teach.

GUIDELINES

Promoting Language Learning

Provide structures, frameworks, scaffolds, and strategies.

Examples

1. "Think aloud" as you solve a problem by building on and clarifying the input of students.
2. Use visual organizers, story maps, or other aids to help students organize and relate information.

Support verbal explanations with visual cues.

Examples

1. Use facial expressions and gestures to emphasize meaning.
2. Use charts, maps, graphs, pictures, films, videos, web pages, and concrete materials.

Teach relevant background knowledge and key vocabulary concepts.

Examples

1. Informally assess students' current background knowledge. Directly teach needed information if missing.
2. Focus on key vocabulary words, and use those words consistently.

Give focused and useful feedback.

Examples

1. Focus feedback on meaning, not grammar, syntax, or pronunciation.
2. Give frequent, brief, clear feedback. Use words from the student's first language when you can.
3. Make sure to let students know when they are successful.
4. Break assignments and activities into smaller, "bite-sized pieces," with feedback after each "bite."

Keep students involved and engaged.

Examples

1. Use small-group and pairs work.
2. Create situations where students talk at length.
3. Challenge students with clear higher-order questions. Allow them time to think and write out answers, maybe in pairs.

Show authentic respect for students' culture and language.

Examples

1. Learn about your students' personal and language backgrounds: What languages are spoken at home? When did the family arrive in the United States? How long have they lived here? What schooling did they receive in other countries?
2. Learn about the students' religious backgrounds, food preferences and restrictions, and family customs; then incorporate students' experiences into writing and language arts activities.
3. Learn some key words in the students' languages—this is an opportunity for you to become a more global and sophisticated language learner.
4. View diversity as an asset; reject cultural deficit notions.

Source: Based on Peregoy, S. F., &. Boyle, O. F. (2017). *Reading, writing, and learning in ESL: A resource book for teaching K–12 English learners* (7th ed.). Boston, MA: Pearson; Echevarría, J., Vogt, M., & Short, D. J. (2018). *Making content comprehensible for secondary English learners: The SIOP® Model* (3rd ed.). Boston, MA: Pearson; Gersten, R. (1996). Literacy instruction for language-minority students: The transition years. *The Elementary School Journal, 96,* 217–220.

Dialect Differences in the Classroom

Communication is at the heart of teaching, but as we have seen in this cluster, culture affects communication. In this section, we examine two kinds of language differences: dialects and genderlects.

Dialects

Stop & Think When you want a soft drink, what do you call it? Do you think people in other parts of the United States use the same term?

Growing up in Texas, I always asked, "Do you want a *coke*?" If the answer was yes, my next question was "What kind—Coca-Cola, root beer, 7-Up, orange?" When I moved to New Jersey, I had to ask for a *soda*. If I asked for a coke, then that is just what I got. After relocating to Ohio, I had to speak Midwestern and ask for a "*bottlapop*." If you want a milkshake in Massachusetts, better order a *frappe*, or else you will get a glass of flavored milk that has been given a good shake. An Italian sandwich might be a submarine, torpedo, hero, wedge, hoagie, muffuletta, or po'boy depending on where you try to order it (Owens, 2020). Different regions have different ways of speaking—in both their accents and word usage.

The United States has at least 10 regional or geographic dialects; some estimates are closer to 30, and no child born in this country learns dialect-free English. A **dialect** is a language rule system used by a particular group. Like the reservation accent of many Native Americans, that dialect is part of the group's collective identity. Every person reading this book speaks at least one dialect, maybe more, because there is no one absolute, standard English. The English language has several dialects—for example, Australian, Canadian, British, and American. Within each of these dialects are variations. A few examples of dialects of American English are Southern, Bostonian, Cajun, Asian English, Latino English, and Black English. Are the minimalist codes of texting ("BTW, u r sum1 I like") a new dialect (Owens, 2020)?

Dialect
Any variety of a language spoken by a particular group.

Dialects differ in their rules about pronunciation, grammar, and vocabulary, but it is important to remember that these differences are not errors. Each dialect is logical, complex, and rule governed. An example of this is the use of the double negative (Brice & Brice, 2009). In many versions of American English, the double-negative construction, such as "I don't have no more," is incorrect. But in many other dialects, such as some varieties of Black English and in other languages (e.g., Russian, French, Spanish, and Hungarian), the double negative is part of the grammatical rules. To say, "I don't want anything" in Spanish, you must literally say, "I don't want nothing," or "No quiero nada." My husband, from Pennsylvania, drops "to be" in some sentences, such as "The lawn needs mowed" and "The car needs washed."

DIALECTS AND PRONUNCIATIONS. Dialects also differ in pronunciation, which can lead to spelling problems. In some varieties of Black English and in Southern dialects, for instance, less attention is paid to pronouncing the ends of words. A lack of attention to final consonants such as *s* can mean possession, third-person singular verbs, and plurals are not pronounced in the standard way. So *John's book* might be *John book*, and the singular and plural will sound the same for words such as *thinks, wasps*, and *lists.* When endings are not pronounced, there are more *homonyms* (words that sound alike but have different meanings) in the student's speech than the unknowing teacher might expect; *spent* and *spend* may sound alike, for example. Even without the confusions caused by dialect differences, English has many homonyms. Usually teachers give special attention to words such as these when they come up in spelling lessons. If teachers are aware of the special homonyms in student dialects, they can teach these differences directly.

DIALECTS AND TEACHING. How can teachers cope with linguistic diversity in the classroom? First, they can be sensitive to their own possible negative stereotypes about students who speak different dialects. Second, teachers can ensure comprehension by repeating instructions using different words and by asking students to paraphrase instructions or give examples. The best teaching approach seems to be first, focus on understanding the students and accepting their language as a valid and correct system and then teach the alternative forms of English (or whatever the dominant language is in your country) that are used in more formal work settings and writing so that the students will have access to a range of opportunities. Jean Anyon (2012) described how she accomplished this naturally in her elementary classes:

> Indeed, I thought the language my students used was inventive and lovely. I had my students write poems and stories in their own language. We would appreciate the music of their voices. Then, we would talk about the differences between what they wrote and the way I spoke, as I was from a different culture—the white middle class. We would do some translations of their talk and mine, back and forth. In this way, language patterns were seen as different, not good or bad. Discussion of the need for them to learn standard English to function in a white world came naturally out of our activities, not as an imposition. (p. 2)

Code switching
Moving between two speech forms.

Moving between two speech forms is called **code switching**—something we all have learned to do. Sometimes the code is formal speech for educational or professional communication. At other times the code is informal for talk among friends and family. And occasionally the codes are different dialects. Even young children recognize variations in codes. Delpit (1995) describes the reaction of one of her first-grade students to her very first reading lesson. After she carefully recited the memorized introduction from the teacher's manual, a student raised his hand and asked, "Teacher, how come you talkin' like a white person? You talkin' just like my momma talk when she get on the phone."

Learning the alternative versions of a language is easy for most children, as long as they have good models, clear instructions, and opportunities for authentic practice.

Genderlects

Genderlects
Different ways of talking for men and women.

If you had to guess what **genderlects** are, based on what you know about dialects, you probably would figure out that genderlects are different ways of talking for men and women. There are more similarities than differences in the speech of girls and boys, but there are some small differences. Girls use more polite words such as *please* and *goodbye*; more descriptive words such as *adorable, lovely*, and *sweet*; and a fuller range of terms for colors. Girls tend to be slightly more talkative and affiliative in their speech (affiliative speech is talk intended to establish and maintain relationships) (Owens, 2020). But much of the research has been conducted with White, middle-class children, and the results do not necessarily hold true for other groups and cultures. For example, some research reports that girls are more likely to cooperate and to talk about caring, whereas boys are more competitive and talk about rights and justice. For men, conversations are opportunities for debate and competition. But other studies have found that Black girls in one study were just as likely as boys to compete and talk about their rights in conversations (Leaper & Smith, 2004; Owens, 2020).

As with most aspects of language, cultural differences occur in genderlects. Interrupting is a good example. In the United States, boys interrupt more often than girls, but in Africa, the Caribbean, South America, and Eastern Europe, women interrupt men much more often than they do in the United States. And in Thailand, Hawaii, Japan, and Antigua, the style of speaking for boys and girls is overlapping; this overlapping talk is not interruption but cooperative turn taking (Owens, 2020).

Module 20 Summary

The Development of Language (pp. 249–256)

How are humans predisposed to develop language? What roles do culture and learning play? Cultures create words for the concepts that are important to them. Children develop language as they build on other cognitive abilities by actively trying to make sense of what they hear, looking for patterns, and making up rules. In this process, built-in biases and rules may limit the search and guide the pattern recognition. Reward and correction play roles in helping children learn correct language use, but the child's thought processes are very important.

What are the elements of language? By age 5, most children have mastered almost all the sounds of their native language. In terms of vocabulary, we understand more words than we use. By age 6, children understand up to 20,000 words and use about 2,600 words. Understanding words that express abstract ideas and hypothetical situations comes later as cognitive abilities develop. As children develop an understanding of grammar, they may apply new rules too widely, saying "broked" for "broken," for example. Understanding the passive voice in syntax develops after understanding active voice.

What are pragmatics and metalinguistic awareness? Pragmatics is knowledge about how to use language—when, where, how, and to whom to speak. Metalinguistic awareness, knowledge about your own use of language and how language works, begins around age 5 or 6 and develops throughout life.

What are the most important skills that help literacy emerge? Research has identified two broad categories of skills that are important for later reading: (a) understanding sounds and codes such as knowing that letters have names, that sounds are associated with letters, and that words are made up of sounds and (b) oral language skills such as expressive and receptive vocabulary, knowledge of syntax, and the ability to understand and tell stories. For bilingual students, growth in receptive language in L1 or L2 predicts early reading success. Parents and teachers can support emerging literacy for everyone by reading with children, retelling stories and talking about them, and limiting time spent with television, other media, and digital devices.

Diversity in Language Development (pp. 256–262)

What is involved in learning two languages? Children can learn two languages at once if they have adequate opportunities in both languages. There are cognitive advantages to learning more than one language, so it is valuable to retain your heritage language even as you learn another. The best time to learn accurate pronunciation is early childhood, but people of any age can learn a new language. Having overheard a language as a child can improve one's ability to learn that language as an adult. Even though the advantages of bilingualism seem clear (e.g., increased cognitive abilities, creativity, phonemic and metalinguistic awareness, advantages in career and business, protection against dementia), many children and adults are losing their heritage language. Rather than losing one language to gain another, the goal should be balanced bilingualism—being equally fluent in both languages. People who can communicate in both a spoken and a signed language or in two different signed languages are considered bilingual.

What does it mean to be truly bilingual? Some definitions of bilingualism focus exclusively on a language-based meaning: Bilingual people, or bilinguals, speak two languages. Other definitions are more rigorous and define bilinguals as adults who use their two languages effectively in their adult daily lives, which includes being bicultural as well—moving back and forth between two cultures and two languages while still maintaining a sense of identity. Proficiency in a second language has two separate aspects: face-to-face basic communication skills that take about 2 to 3 years in a good program to develop, and academic uses of language such as reading, writing, grammar, knowing specialized academic vocabulary, and understanding math problems, science charts, and study skills (known as *academic English*) that take about 6 to 9 years or more to develop. In fact, academic language should be considered a *new language* that people must learn in order to succeed in school. So all students, but especially those who may not speak formal English at home, must become bilingual and

bicultural academically; they must learn the new ways of speaking and cultural rules required for school. Bilingual students also often struggle with social adjustment problems related to biculturalism.

How do cultural differences affect bilingual students? Cultural differences might interfere with developing academic English and content understanding. For example, many Asian students come from a culture that believes asking the teacher questions is rude and inappropriate because questioning implies that the teacher has done a poor job of instruction. Teachers need to ask themselves why their students who are English learners (ELs) are not asking questions. Beliefs about learning shaped by culture and previous experiences in different kinds of classrooms may explain why students who are ELs seem quiet and reluctant to speak in class. These students may also think that their teachers are not very good because the teachers do not explain everything. They also may strongly prefer memorization as a learning strategy if memorization was emphasized in their previous schools.

Dialect Differences in the Classroom (pp. 263–264)

What is a dialect? A dialect is any variety of a language spoken by a particular group. The dialect is part of the group's collective identity. Every person reading this book speaks at least one dialect, maybe more, because there is no one absolute standard English. Dialects differ in their rules about pronunciation, grammar, and vocabulary, but it is important to remember that these differences are not errors. Each dialect is logical, complex, and rule governed. There are even some differences in how males and females talk, called genderlects.

How should teachers take dialects into account? Teachers can be sensitive to their own possible negative stereotypes about students who speak a different dialect. Teachers also can ensure comprehension by repeating instructions using different words and by asking students to paraphrase instructions or give examples. The best teaching approach seems to be first focusing on understanding the students and accepting their languages as valid and correct systems and then teaching the alternative forms of English (or whatever the dominant language is in the teachers' country) that are used in more formal work settings and writing so that the students will have access to a range of opportunities.

MODULE 21 Teaching English Learners

Learning Objective 6.4 Compare and contrast immigrant and refugee students, including their learning characteristics and needs.

Learning Objective 6.5 Describe Generation 1.5 students and teaching methods for English learners, including English immersion, bilingual instruction, and sheltered instruction. Explain the affective considerations, including trauma, that can impact these students and how family involvement can help.

Learning Objective 6.6 Discuss how teachers can recognize special learning needs and talents when they do not speak their students' first languages.

Teaching Immigrant Students and English Learners

Felipe Vargas is a fifth-grader who came with his family from Mexico to the United States more than 3 years ago so his father could take a job in a chicken-processing plant. Many Mexicans have come to work at the plant, and now there is a Spanish-speaking church, a Mexican grocery, and a Mexican bar and restaurant in the little northern Georgia town where they live. Felipe's mother, who takes care of the home and children, speaks no English, but his father and his older brother, Enrique, both speak a little. Enrique was 15 when the family came to this country. He left school to work in the chicken plant after completing

only 1 year in an English for speakers of other languages (ESOL) program. He is proud to be contributing to the family but dreams of being a car mechanic; he spends all his free time fixing cars for neighbors and earns a little extra money that way. Felipe's oldest sister, Karia, is 15 now. She spent 2 years in an ESOL program before transitioning to regular English-speaking classes. Her parents have chosen a husband for her from "back home," and she plans to leave school as soon as she turns 16. Felipe's two younger sisters are 8 and 4; the youngest is in a special Head Start class to learn English, and the other is repeating second grade because she is having a hard time learning to read.

Felipe gets mostly C's in school. He still struggles a bit with reading his textbooks, but he has many Anglo friends in his class and has no trouble speaking English with them; in fact, he translates for his parents when they come to school for parent conferences, which they do whenever his father can get off work. Math is his real talent; he consistently gets A's on his tests, and he is in the highest "math group," so he goes to another teacher for math. That teacher calls him "Phillip" and tells him he could be an accountant or maybe an engineer when he grows up. Felipe likes this idea, but his father says that college would cost too much money and reminds him that the family plans to go back to Mexico someday when they have saved enough to buy a small farm, which is his father's dream.

American schools today have so many students like Felipe, Karia, and Enrique. For the remainder of this cluster, we explore ways of teaching these students so that their dreams of college and careers can come true wherever they finally live.

Immigrants and Refugees

The United States has more immigrants than any other country in the world. **Immigrants** are people who voluntarily leave their country to become permanent residents in a new place. Today the largest number of immigrants in the United States, 28%, is from Asian countries, followed by 25% from Mexico like Felipe's family, 15% from Central and South America, 13% from Europe and Canada, and the rest from the Caribbean, the Middle East, and Africa (Budiman, 2020). **Refugees** are a special group of immigrants who also relocate voluntarily. They are "unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion" (UNHCR, 2021). Since 1975, more than 3 million refugees have permanently resettled in the United States (ORR, 2020). Recently refugees are from a range of countries in Africa, the Middle East, Asia, Ukraine, and Russia (National Immigration Forum, 2020).

Immigrants
People who voluntarily leave their country to become permanent residents of a new place.

Refugees
A special group of immigrants who also relocate voluntarily but who are fleeing their home country because living there is not safe.

It is the law in the United States that all children have the right to a free public education, no matter their immigration status. In earlier decades, these new immigrants were expected to assimilate—to enter the cultural **melting pot** and become like those who had arrived earlier. For years, the goal of American schools was to be the fire under the melting pot. Immigrant children who spoke different languages and had diverse religious and cultural heritages were expected to come to the schools, master English, and learn to become mainstream Americans. Of course, most schools were designed to serve European American, middle-class children, so it was the immigrant students—rather than the schools—who were expected to do the adapting and changing. *Involuntary immigrants*, descendants of the enslaved people forced to migrate to the United States, often were not welcome at all in the cultural melting pot.

Melting pot
A metaphor for the absorption and assimilation of immigrants into the mainstream of society so that ethnic differences vanish.

In the 1960s and 1970s, some educators suggested that immigrants, students of color, and poor students had problems in school because they were "culturally disadvantaged" or "culturally handicapped." The assumption of this **cultural deficit model** was that the students' home cultures were inferior because they had not prepared the students to fit into the schools. Today, educational psychologists reject the idea of cultural deficits. They believe that incompatibilities may exist between the students' home culture and the expectations of the U.S. schools (Gallimore & Goldenberg, 2001). Also, there is an increasing sense among many ethnic groups that they do not want to assimilate completely into mainstream American society. Rather, they want to maintain their culture and identity while still being a respected part of the larger society. Multiculturalism is the goal—more like a salad bowl filled with many ingredients instead of the prior melting pot idea (Banks, 2019; Stinson, 2006).

Cultural deficit model
A model that explains the school achievement problems of ethnic minority students by assuming that their cultures are inadequate and do not prepare the students to succeed in school.

Classrooms Today

In 2019, children living with at least one immigrant parent made up about 26% of children and adolescents under the age of 18 in the United States. The states with the largest percentages of these children were California, New Jersey, Nevada, New York, and Texas. In all these states, the children of immigrant parents represented from almost half to over one-third of the school-age children in the state (Batalova et al., 2021). Even though about 90% of these children were born in the United States, many are English learners (Gándara, 2018). **English learners** (people who are learning English, often called ELs) are the fastest-growing segment of the U.S. population. In some school districts and curriculum materials, you might see the term *ELL* (*English language learners*). Check to be sure what the terminology is in your district.

English learners (ELs)
Students who are learning English and whose primary or heritage languages are not English.

There are almost 5 million students in U.S. schools learning English, many in the South and Midwest that have had very few of these students in the past (Mitchell, 2020). But not all English learners speak Spanish as their first language like Felipe does. You saw earlier that more than one-quarter of immigrants today are from Asian countries, and in six U.S. states, an American Indian or Native Alaskan language is one to the top five spoken by ELs (Villegas, 2020). In addition, U.S.-born children of immigrant families make up another group needing specialized language teaching. Even at the beginning of high school, these students may still lack the skills in academic English—school language—needed to succeed in their often complex, abstract courses (Dixon et al., 2012; Slama, 2012). Given the challenges of teaching students who have a range of English-speaking abilities, coupled with the demands of accountability testing, it is clear that teachers everywhere are under pressure (Garcia & Tyler, 2010).

These changes are not limited to the United States. In fact, all the developed countries have many immigrant students. These numbers are only increasing, both with the recent refugee crises and as developed countries seek qualified workers from around the world.

Four Student Profiles

Following are four general profiles of students who are ELs in today's classrooms (Echevarría & Graves, 2015). Of course, every student is an individual and may not fit neatly into one of these categories.

- *Balanced bilinguals.* These students speak, read, and write well both in their first language and in English. They have the academic knowledge needed to continue learning in both languages and the skills and attitudes to do so. These students may not present difficult teaching challenges, but they do need to *maintain* their skills in both languages and cultures.
- *Monolingual/literate students.* These students are literate in their native language (at or above grade level when working in their native language) but speak limited English. The teaching challenge here is to help the students develop English and continue to learn academic subjects.
- *Monolingual/preliterate students.* These students are not literate. They may not read or write in their native language, or they may have very limited literacy skills. Some have never attended school. In addition, they speak limited English. These students require the greatest support in learning both academic subjects and language.
- *Limited bilingual.* These students can converse well in both languages, but for some reason, they have trouble learning academically. They might have underlying challenges such as specific learning disabilities or emotional problems. Further testing often is helpful to diagnose these problems.

These student profiles are related to the distinction we encountered earlier in the cluster between basic conversational language and academic language. Remember, it takes from 2 to 3 years to develop good conversational language but 6 to 9 (or even as many as 10) years to master academic language. Be aware, however, that in many academic areas, some children from immigrant families will surpass their classmates from native-born families, so don't

assume there will be problems—get to know the students (Koury & Votruba-Drzal, 2014). If you teach at a school with many students who are ELs, school personnel will probably conduct formal assessments to provide appropriate placements for these individuals.

Generation 1.5: Students in Two Worlds

Put Yourself in Their Place Imagine you are this person:

> You came to the United States at about the age of 1. Your family was undocumented. You have a younger brother and sister who were born in the United States and are legal citizens, but you are not. Your parents and older siblings worked hard, often two jobs, so that the younger children could get a good education. You attended kindergarten, elementary, and high school in your family's new community in the United States. You graduated from high school with good grades and hoped to attend college but soon discovered you did not qualify for scholarship support and would have to pay international student tuition, which you cannot afford. Even as a hard-working and promising student, you cannot legally work, vote, or drive in many states in spite of the fact that you have lived virtually all your life in the United States and speak fluent English.

If you were this student, you would be a member of a large group, often called **Generation 1.5** because their characteristics, educational experiences, and language fluencies are somewhere in between those of students born in the United States and students who are recent immigrants (Gonzalez, 2010). They were not born in the United States but have lived here most of their lives because they came with their families when they were very young. The language spoken in their homes may not be English, but they often speak fluent conversational English, even if their academic English is not as well developed. Dubarry and Alves de Lima (2003) describe several other kinds of Generation 1.5 students:

Generation 1.5
Students whose characteristics, educational experiences, and language fluencies are somewhere in between those of students born in the United States and those of students who are recent immigrants.

- Students from U.S. territories such as Puerto Rico, sometimes called "in-migrants"
- U.S.-born children of immigrants who live in close-knit communities where the heritage language is maintained by the residents for family and business life
- Children who are sent by their often-wealthy parents to live with older siblings in order to receive an education in the United States, sometimes called "parachute children"
- Children of families who move back and forth between different countries
- Immigrants who speak other "Englishes" such as English from Jamaica, East India, or Singapore

These students may share several characteristics and challenges. They may not have developed strong literacy skills in the language used at home because their schooling was not in that language. They may have acquired much of their English through listening to and speaking with friends or older siblings, watching television, or listening to music. They have been called "ear learners" because they have built their knowledge of English on the language they have heard in their environment. But what they hear is often colloquial language or slang, so they might have trouble learning how to read and write accurately in English. Many of us know if the grammar is correct in what we hear or read because we have heard (mostly) accurate grammar all our lives—our ears have taught us well. But for many Generation 1.5 students, their ear learning has given them an incomplete understanding of English grammar. Because they are "ear learners," they may use incorrect verb or noun forms, mispronounce plurals, or mix up words that sound very similar; for example, *confident* and *confidence*. They rely on context, gestures, facial cues, and intonations to make sense of language, so reading is more difficult, and proofreading is hard because they cannot "hear" mistakes. Complex academic reading and writing assignments are very challenging (Harklau et al., 1999; Reid & Byrd, 1998; Roberge, 2002).

In contrast, many of my international graduate students who learned English mostly as "eye learners" through reading, writing, and vocabulary and grammar exercises can write well, but they have difficulty with oral interactions. Knowing what kinds of students you have and how they first learned English should help you understand the mistakes they make and the challenges they face.

Bilingual Education and English Learners

Limited English proficient (LEP)
A term also used for students who are learning English when their primary or heritage language is not English—not the preferred term because of the negative connotations. Use *English learner (EL)* instead.

In the United States, students who are just learning English are sometimes described as being **limited English proficient (LEP)**, but *avoid using this label*. The term implies a deficiency instead of an opportunity to learn multiple languages. More often, as we have seen, these students are called English learners (ELs) because their primary or heritage language is not English. **English as a second language (ESL)** is the name given to the *classes* devoted to teaching these students English. Many people prefer the term *ESOL* (English for speakers of other languages) because students learning English might be adding it as a third or fourth language. This was the name of Felipe Vargas's program (you met him earlier). One issue around diversity in language development is how we should teach these students to make sure they are fully able to participate in educational and career opportunities.

English as a second language (ESL)
The classes devoted to teaching English to students who are English learners.

TWO APPROACHES TO LEARNING ENGLISH. Virtually everyone agrees that all citizens should learn the most commonly used language of their country. But when and how should instruction in that language begin? Is it better to teach students who are English learners to read first in their primary (heritage) language, or should they begin reading instruction in English? Do these children need some oral lessons in English before reading instruction can be effective? Should other subjects, such as mathematics and social studies, be taught in the primary language until the children are fluent in English? As you can see in the *Point/Counterpoint*, debates about this question have raged for quite a while.

POINT/COUNTERPOINT: What Is the Best Way to Teach English Learners?

There are two basic positions on this question: One focuses on *immersion* in English-only teaching to make the transition to English as quick as possible. The other approach attempts to *maintain or improve* the native language and use that language as the primary teaching language until English skills are more fully developed.

Point

Structured English immersion is the best approach for English learners. Proponents of the *immersion/quick transition* approach believe that English ought to be introduced as early and as intensively as possible; they argue that valuable learning time is lost if students are taught in their native language. Early advocates cited the successes of the Canadian Immersion program as evidence that language immersion works (Baker, 1998). Many schools today follow this line of thinking and offer **Structured English immersion (SEI)**. Perspectives on SEI differ, but usually it is defined as having two basic features: (a) Teachers use English as much as possible in instruction, and (b) the level of the students' abilities in the class determines *how* teachers use and teach English—the instruction must be appropriate for all students' abilities (Ramirez et al., 1991). There are at least three reasons schools adopt this approach (Clark, 2009):

Structured English immersion (SEI)
An environment that teaches English rapidly by maximizing instruction in English and using English at a level appropriate to the abilities of the students in the class who are English learners.

1. Some states have mandated this immersion by law and have limited the amount of teaching that can be done in the students' native language.
2. The accountability tests that all school districts in the United States must administer are in English. Schools where students don't score well on these tests face penalties, so getting the test takers to achieve English proficiency as fast as possible benefits the schools.

(*Continued*)

3. Schools are concerned that students who do not get intensive and continuing English instruction may learn adequate conversational English but never develop the academic English needed for achievement in secondary schools and beyond.

Immersion in a language is a good way to learn a new language and is the basis for many language-learning programs around the world (Clark, 2009). Given enough time, most students in immersion programs eventually develop some proficiency in English but not necessarily the proficiency of a native speaker (Bialystok, 2018).

Counterpoint

Students' native language should be maintained. Supporters of immersion overlook the fact that Canadian Immersion schools taught in both English and French, so both languages were developed (Diaz-Rico, 2018). *Teaching in English only* and hoping students will figure it out is not the same as *teaching English*. Early proponents of *native-language maintenance instruction* (often called *dual-language instruction* today) raise four important issues (Gersten, 1996; Goldenberg, 1996; Hakuta & Garcia, 1989):

1. Thorough learning in the first language supports second-language learning. For example, research on a large national sample that followed eighth-graders for 12 years found that for Latino students, proficiency in the first language of Spanish predicted reading ability in English and English reading ability predicted achievement in school and in careers (Guglielmi, 2008, 2012). When students learn English, they do not forget the learning strategies and academic content (math, science, history, etc.) that they learned in their native language. In addition, the vocabulary learned in one language can support vocabulary learning in another language (Goodrich et al., 2013).
2. Children who are forced to try to learn math or science in an unfamiliar language are bound to have trouble. What if you had been forced to learn fractions or biology in a language that you had studied for only a semester? Some psychologists believe students taught by this approach may become **semilingual**; that is, they are not proficient in either language. Being semilingual might be one reason the dropout rate is so high for Latino students from low-socioeconomic-status backgrounds (Diaz-Rico, 2018; Ovando & Collier, 1998).
3. If the first language is neglected and the entire emphasis is on English, students may get the message that their home languages (and, therefore, their families and cultures) are second-class.
4. Years ago, Kenji Hakuta cited a "paradoxical attitude of admiration and pride for school-attained bilingualism on the one hand and scorn and shame for home-brewed immigrant bilingualism on the other" (Hakuta, 1986, p. 229). Ironically, by the time students have mastered academic English and let their home language deteriorate, they reach secondary school and are encouraged to learn a "second" language. Sometimes native speakers of Spanish are encouraged to learn French or German, so they risk becoming semilingual in three languages (Miranda, 2008).

Semilingual
A lack of proficiency in any language; speaking one or more languages inadequately.

Beware of Either/Or

It is difficult to separate politics from practice in the debate about bilingual education. High-quality bilingual education programs can clearly have positive results. Students improve in the subjects that were taught in their native language, in their mastery of English and reading comprehension, and in their self-esteem as well (Bialystok, 2018; Reljic et al., 2015). But attention today is shifting from debate about general approaches to a focus on effective teaching and assessment strategies. As you will see many times in this book, a combination of clarity of learning goals and direct instruction in needed skills seems to be effective. The instruction should include learning strategies and tactics, teacher- or peer-guided practice leading to independent practice, authentic and engaging tasks, opportunities for interaction and conversation that are academically focused, and warm encouragement from the teacher. Also, to get a true picture of what students have learned in a subject area, the students may need to be tested in their primary language. If we test students in English while they are still learning English, the math, history, or science test is really a test of English proficiency (Cheung & Slavin, 2012; Gersten, 1996; Goldenberg, 1996; May, 2017).

RESEARCH ON BILINGUAL EDUCATION. There are strong advantages for simultaneous bilingual maintenance learning (Diaz-Rico, 2018). Remember Petitto's (2009) finding that monolingual English speakers who participated in a bilingual program excelled in the skills needed for reading in both languages. When the National Literacy Panel on Language—Minority Children and Youth reviewed studies of English-only *immersion* versus native-language *maintenance* programs, they found that the students in the native-language maintenance programs performed better on many different measured outcomes (Francis et al., 2006). A summary of the research comparing immersion with language maintenance programs in Europe reached the same conclusion—bilingual maintenance programs are more effective (Reljic et al., 2015).

But do programs always "do what they say"—that is, does the actual teaching match the name given the program? Maybe not. In a study that directly compared immersion and maintenance programs in 128 classrooms in Texas and California, Lee Branum-Martin and his colleagues (2010) found that the amount of teaching conducted in English and Spanish could not be predicted by the type of program—there were many local variations. Some English immersion teachers used quite a bit of Spanish, and some Spanish language maintenance programs taught quite a bit in English. Another finding was that Spanish language maintenance programs had a positive impact on English performance.

A study funded by the U.S. Department of Education (Gersten et al., 2007) identified five major recommendations for English learners, summarized here (Peregoy & Boyle, 2017).

1. Begin instruction with a formative assessment (see Cluster 15) of reading to determine exactly what the English learners know and what they are ready to learn and to identify students who will need more help in reading.
2. Use small-group interventions to focus instruction on the areas of need identified in the assessments.
3. Target teaching essential vocabulary for the content in your curriculum as well as common words, phrases, and expressions used in class.
4. Directly teach *academic* English—develop the students' abilities to read texts, write academic assignments, and use formal language and argument.
5. Make wide use of peer-assisted learning, particularly working in pairs, to complete academic tasks.

There are many effective strategies for teaching English learners. Next we will look at two examples: visual strategies and reader response.

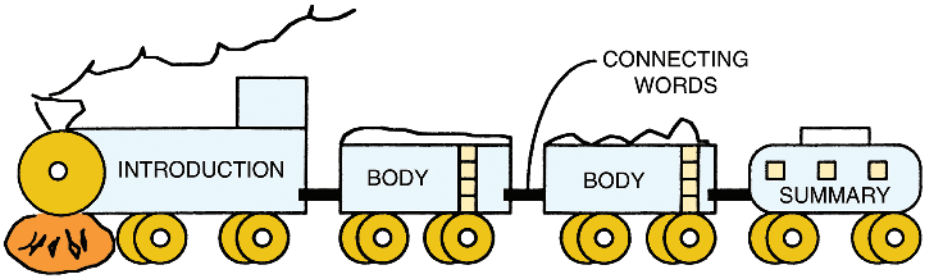
VISUAL STRATEGIES. Visual strategies provide supports for learning everything from letter–sound connections to vocabulary to understanding text structure. Young students can draw pictures and label them in two languages. They can learn about higher-level concepts by grouping pictures in categories and labeling the categories. Older students might learn about writing an essay by referring to the visual support in Figure 6.2 (Peregoy & Boyle, 2017).

LITERATURE RESPONSE GROUPS. The goal of teaching ELs is for them to become capable readers, writers, and speakers of English. *Literature response groups*, also called *literature circles*, provide these opportunities using fiction and nonfiction texts. Three to six students read a text and then discuss and debate what they read, making sure everyone participates, speaks, listens, and understands. They might also write about the reading and then critique each other's work. Often the teacher provides a discussion guide such as the one shown in Figure 6.3 from Peregoy and Boyle (2017, p. 349).

BILINGUALISM FOR ALL: TWO-WAY IMMERSION. Students in the United States need to master both conversational and academic English to achieve at high levels, but they should not sacrifice their native language in the process. The goal of schools should be *balanced bilingualism*. One approach to reaching this goal is to create two-way immersion classes that include native speakers of one language and native speakers of the other, with instruction in both languages. The objectives are for both groups to become fluent in both languages, learn academic content, and develop cultural knowledge along with positive

Figure 6.2 A Visual to Support Learning How to Write an Essay

The teacher explains that one good structure for an essay is like a train, with each part playing an important role. For example, the introduction guides where the essay is going just like the engine guides the direction of the train.



Introduction:	In the introduction you should say the main things you want to say in your essay.
Body:	This section gives information that will support the ideas you said in the introduction. Each new paragraph might give different information just as each new train car might be carrying different materials, but each new section relates to the main ideas.
Connecting Devices:	You'll want to connect paragraphs to one another to make it easier for the reader to see how each paragraph relates. To do this you might use words such as *moreover*, *in addition*, etc.
Summary or Conclusion:	In the summary you'll want to remind the reader of the major ideas you wanted to present in your essay.

Source: *Peregoy, Suzanne F., & Boyle, O. F. Reading, writing and learning in ESL: A resource book for teaching K–12 English learners (7th ed.). © 2017, p. 414 (Figure 10.5). Reprinted and electronically reproduced by permission of Pearson Education, Inc., Upper Saddle River, NJ.*

Figure 6.3 An Example Literature Response Sheet

Teachers using this sheet remind students to accept and respect the opinions of others, remember that stories have many different interpretations, and feel free to develop their own questions.

1. If you did (or didn't) like the book, was there one event, character, or aspect of the book that caused this reaction? What? Why?
2. Do your response group members share a common reaction to the book? What reactions are the same? What are different?
3. If you were faced with the same problems as the main character in the book, would you have responded in a similar manner? Why?
4. How was the main character feeling when we first met him or her? Have you ever felt like the character?
5. How do you feel about the ways the main character behaves with other characters?
6. Did any of the characters remind you of anyone you have known? Yourself?
7. Do you think the author was trying to teach us something? If so, what?
8. Would you change the ending of the book? If so, how?
9. Which character would you like to have met? What would you want to say or do when you met the character?
10. Did your feelings change toward the character(s) as the story progressed? What made your feelings change?
11. If you could step inside the book and be part of the story, where would you enter? Who would you be? What would you do? How would these things change the story?
12. What things would be different in this story if it took place in a different period of time or a different place?

Source: *Peregoy, Suzanne F., & Boyle, O. F. Reading, writing and learning in ESL: A resource book for teaching K–12 English learners (7th ed.). © 2017, p. 349 (Figure 9.2). Reprinted and electronically reproduced by permission of Pearson Education, Inc., Upper Saddle River, NJ.*

attitudes about others and a stronger sense of their own identity (Hamman-Ortiz & Palmer, 2020; Peregoy & Boyle, 2017).

For truly effective EL instruction, we will need many bilingual teachers. If you have a competence in another language, you might want to develop it fully for your teaching. Thirty-two states and the District of Columbia report shortages of bilingual teachers (Liebtag & Haugen, 2015), and promoting language learning is a responsibility for most teachers.

When students exit an immersion or a bilingual program with some English skills, they are not finished learning. The next phase for many students is sheltered instruction.

Sheltered Instruction

The challenge for most teachers working with immigrant and EL students is to teach the subject matter and develop students' English language skills at the same time. **Sheltered instruction** is one approach that has proved successful in reaching both goals. Sheltered instruction teaches content to EL students by putting the words and concepts of the content into context to make the content more understandable. Strategies include simplifying and controlling language, giving attention to the relevant grammar and forms of English—helping students "crack the code," using visuals and gestures, and including real-life supports and examples. In addition, this instruction emphasizes student talk and discussion instead of the teacher doing all the talking. To be clearer about what good sheltered instruction looks like, Jana Echevarría and her colleagues (Echevarría et al., 2018; Vogt & Echevarría, 2022) identified eight key elements: preparation, building background, comprehensible input, strategies, interaction, practice and application, lesson delivery, and review and assessment. Then the researchers developed an observational system to check that each element is included in lesson plans. The system is called the **Sheltered Instruction Observation Protocol (SIOP®)**. Figure 6.4 gives some examples of what each element of the SIOP® might include.

Sheltered instruction
Approach to teaching that improves English language skills while teaching content to students who are English learners by putting the words and concepts of the content into context to make the content more understandable.

Sheltered Instruction Observation Protocol (SIOP®)
An observational system to ensure that each element of sheltered instruction is present for a teacher.

What might a SIOP® lesson look like? There are many ways to design lessons that meet the standards in Figure 6.4. Table 6.4 on page 277 describes seven different lesson structures and activities to help students understand content and develop language skills.

Affective and Emotional/Social Considerations

Put Yourself in Their Place You walk into one of your education classes. The instructor moves to the lectern and says:

> Mina-san, ohayō gozaimasu. Kyō wa, kyō iku shinrigaku no jū gyō ja arimasen. Kyō wa, nihon no bangō, ichi kara jū made benkyō oshimasu. Soshite, kono kyō shitsu wa Amerika no kyō shitsu ja arimasen. Ima wa Nihon no kyō shitsu desu. Nihon no kyō shitsu dewa, shinakerebanaranai koto wa mittsu mo arimasu. Tatsu, rei, suwaru. Mina-san, tatte kudasai. Doshite tatteimasen ka? Wakarimasen ka?

The class continues in the same way until you are handed the "test" and told to "Do your best—this is 20% of your grade." You can't believe it! What would you do?

Does this seem impossible? Actually, one of my doctoral students (Yough, 2010) designed this lesson (without the test) so his educational psychology class would experience how it feels to have important content taught in a language you don't speak (assuming your Japanese is a bit rusty!). Research on EL students shows that they may experience severe challenges and stress in school. They may feel that they don't belong and that others are making fun of them or just ignoring them. Everyone else seems to know the rules and the right words. It takes courage and persistence to keep trying to communicate; it is easier to say as little as possible. So the practice in communicating that these students desperately need just doesn't happen. Also, research shows that anxiety is more likely to affect attention and comprehension in reading when students read in a second language compared to reading in their first language, especially for language learners who are prone to reading anxiety (Rai et al., 2015).

Figure 6.4 Some Examples of the Sheltered Instruction Observation Protocol (SIOP®)

The SIOP® has 30 characteristics or areas to assess during observation. Each characteristic is rated from 4 (Highly Evident) to 0 (Not Evident) or NA (Not Applicable). These ratings are converted into a score. (L1 means the original language, and L2 means the second language.)

Observer: _____ Teacher: _____
Date: _____ School: _____
Grade: _____ ESL level: _____
Class: _____ Lesson: Multi-day Single-day (circle one)
Total Points Possible: 120 (Subtract 4 points for each NA given)
Total Points Earned _____ *Percentage Score* _____

Directions: Circle the number that best reflects what you observe in a sheltered lesson. You may give a score from 0–4. Cite under "Comments" specific examples of the behaviors observed.

	Highly Evident		Somewhat Evident		Not Evident	NA
	4	3	2	1	0	
Preparation						
1. **Content objectives** clearly defined, displayed, and reviewed with students	☐	☐	☐	☐	☐	☐
2. **Language objectives** clearly defined, displayed, and reviewed with students	☐	☐	☐	☐	☐	☐
3. **Content concepts** appropriate for age and educational background level of students	☐	☐	☐	☐	☐	☐
4. **Supplementary materials** used to a high degree, making the lesson clear and meaningful (e.g., computer programs, graphs, models, visuals)	☐	☐	☐	☐	☐	☐
5. **Adaptation of content** (e.g., text, assignment) to all levels of student proficiency	☐	☐	☐	☐	☐	☐
6. **Meaningful activities** that integrate lesson concepts (e.g., interviews, letter writing, simulations, models) with language practice opportunities for reading, writing, listening, and/or speaking	☐	☐	☐	☐	☐	☐
Comments:						
Building Background						
7. **Concepts explicitly linked** to students' background experiences	☐	☐	☐	☐	☐	☐
8. **Links explicitly made** between past learning and new concepts	☐	☐	☐	☐	☐	☐
9. **Key vocabulary emphasized** (e.g., introduced, written, repeated, and highlighted for students to see)	☐	☐	☐	☐	☐	☐
Comments:						
Comprehensible						
10. **Speech** appropriate for students' proficiency level (e.g., slower rate, enunciation and simple sentence structure for beginners)	☐	☐	☐	☐	☐	☐
11. **Clear explanation** of academic tasks	☐	☐	☐	☐	☐	☐
12. A variety of techniques used to make **content concepts** clear (e.g., modeling, visuals, hands-on activities, demonstration, gestures, body language)	☐	☐	☐	☐	☐	☐
Comments:						
Strategies						
13. Ample opportunities for students to use **learning strategies**	☐	☐	☐	☐	☐	☐
14. **Scaffolding techniques** consistently used assisting and supporting student understanding (e.g., think-alouds)	☐	☐	☐	☐	☐	☐
15. A variety of questions or tasks that promote **higher-order thinking skills** (e.g., literal, analytical, and interpretive questions)	☐	☐	☐	☐	☐	☐
Comments:						
Interaction						
16. Frequent opportunities for **interaction** and discussion between teacher/student and among students, which encourage elaborated responses about lesson concepts	☐	☐	☐	☐	☐	☐
17. **Grouping configurations** support language and content objectives of the lesson	☐	☐	☐	☐	☐	☐

(*Continued*)

	Highly Evident		Somewhat Evident		Not Evident	NA
	4	3	2	1	0	
18. Sufficient **wait time for student response** consistently provided	☐	☐	☐	☐	☐	☐
19. Ample opportunities for students to **clarify key concepts in L1** as needed with aide, peer, or L1 text	☐	☐	☐	☐	☐	☐
Comments:						
Practice/Application						
20. **Hands-on materials and/or manipulatives** provided for students to practice using new content knowledge	☐	☐	☐	☐	☐	☐
21. Activities provided for students to **apply content and language knowledge** in the classroom	☐	☐	☐	☐	☐	☐
22. Activities integrate all **language skills** (i.e., reading, listening, and speaking)	☐	☐	☐	☐	☐	☐
Comments:						
Lesson Delivery						
23. **Content objectives** clearly supported by lesson delivery	☐	☐	☐	☐	☐	☐
24. **Language objectives** clearly supported by lesson delivery	☐	☐	☐	☐	☐	☐
25. **Students engaged** approximately 90%–100% of the period	☐	☐	☐	☐	☐	☐
26. **Pacing** of the lesson appropriate to the students' ability level	☐	☐	☐	☐	☐	☐
Comments:						
Review/Assessment						
27. Comprehensive **review of key vocabulary**	☐	☐	☐	☐	☐	☐
28. Comprehensive **review of key content concepts**	☐	☐	☐	☐	☐	☐
29. Regular **feedback provided** to students on their output (e.g., language, content, work)	☐	☐	☐	☐	☐	☐
30. **Assessment of student comprehension** and learning of all lesson objectives (e.g., spot checking, group response) throughout the lesson	☐	☐	☐	☐	☐	☐
Comments:						

Source: *Vogt, M., & Echevarría, J. (2022). 99 ideas and activities for teaching English learners with SIOP® (2nd ed.). Hoboken, NJ: Pearson Reprinted with permission from Pearson Education, Inc.*

DEALING WITH TRAUMA. There is another possible source of anxiety and psychological burden for some immigrant students today—trauma. As you saw in Cluster 5, many children and adolescents have experienced trauma, often severe, and have reactions such as depression or anxiety. The same can be true for immigrant students. Justin Mixon, an immigration lawyer who represents about 200 migrant children, notes that experiences of trauma often forced the children to leave home—the only place they ever knew. "There's always some other kind of plus factor—murder, rape, violence, domestic abuse. They wouldn't normally leave their community, their friends, their language, their food, their grandparents, their culture" (Cardoza, 2019). Students may have been separated from their families or witnessed torture or the death of family members. In their new country, the students might have survived in poor housing with limited resources—all during a time when the pandemic raged in communities with the least support for coping (Crooks et al., 2020). Your students may be terrified to talk about their fears. They have been taught, for good reason, not to tell their White teachers what they are going through: They have been hurt in the past and fear deportation now.

The schools are an important setting for helping immigrant students deal with trauma because the school is one of the first places that these children and adolescents come. There are school-wide programs to support immigrant students such as the 10-session STRONG program in Canada (Supporting Transition Resilience of Newcomer Groups) or CBITS, the Cognitive Behavioral Intervention for Trauma in Schools (Crooks et al., 2020). These programs are usually run by trained clinicians. You might check if any resources like these are available in your school or district.

Table 6.4 Ideas for Lesson Structures in SIOP® That Encourage Understanding of Content and Build Language Skills

STRUCTURE	EXAMPLE/WHAT DOES IT LOOK LIKE?	RATIONALE/WHY DOES IT WORK?
Think-Pair-Share	Instead of asking questions of the whole class and calling on two or three students to respond, the teacher asks everyone to think of an answer or respond to a prompt and tell it to a partner. Then the teacher calls on some students to share their responses with the whole class.	Gives all students a chance to think and speak about the topic. Allows teachers to monitor student understanding of the content and language objectives during a lesson.
Chunk and Chew	The teacher pauses after every 10 minutes and directs students to talk with a partner or in a small group about what they have just learned. In SIOP® lessons, the student talk is carefully structured by the teacher with specific prompts and/or sentence starters, such as "If I could interview any author we read this year, it would be… because…."	Makes new information easier to learn by "chunking" it into learnable, bite-size pieces (see Cluster 8 for why this is important). Gives students a chance to talk using concepts and content from the lesson.
Roam and Review	The teacher poses a reflection question (e.g., "What was the most important thing you learned today?" or "What surprised you in our studies today?"), and students think silently and then stand and roam the classroom, discussing their ideas with classmates.	Gives students a chance to synthesize what they have learned and communicate it in a more conversational manner. They practice communicating.
Podcasts	Students prepare a 2- to 3-minute oral summary on a topic they have selected or the teacher has assigned. They rehearse and then record it on a podcast or an audio file for use on the class computer.	Provides practice in speaking and the chance to hear and improve language. Having an audience increases motivation and encourages careful preparation.
TV Talk Show	Small groups plan a talk show on a topic with multiple parameters that they have studied. One student is the host and interviewer; others are the guests. For example, after studying extreme weather phenomena, one guest might be an expert on hurricanes, another on blizzards, a third on earthquakes, and a fourth on tornadoes.	Videorecording of the show allows the teacher or the students to assess how well the students spoke, used key vocabulary, responded to host questions, and so forth. Having an audience increases motivation and encourages careful preparation.
Writing Headlines	Students capture the essence of a day's lesson, section of a text read, video watched, or information presented orally by writing a headline and then share their headline.	Encourages students to use descriptive language and focus on word choice to create compelling headlines.
E-Journals and Wiki Entries	Students write in an e-journal daily or once a week to reflect on what they have been learning. At the end of a unit, the teacher might ask students to write an online entry for a class wiki that presents key information on a topic being studied.	Encourages synthesizing information and writing longer pieces.

Source: Based on Echevarría, J., Vogt, M., & Short, D. J. (2018). *Making content comprehensible for secondary English learners: The SIOP® Model* (3rd ed.), pp. 212–213. Boston, MA: Pearson.

What can teachers do to deal with students' experiences of trauma and support their courage and persistence in communicating? The first step is to create a classroom community that is caring and respectful. We explore strategies for creating classroom community in Cluster 13. Echevarría and Graves (2015) suggest additional steps to provide emotional support and increase self-esteem for EL students, as you can see in the *Guidelines: Providing Emotional Support and Increasing Self-Esteem for Students Who Are ELs*.

Another problem is related to cultural differences. As we saw earlier, students who immigrate to the United States in their middle or high school years may have experienced very different educational systems and educational values "back home." They may have been very successful in those systems, but when they encounter a different approach to education, suddenly they might struggle and feel incompetent. As a teacher, you need to learn the strengths of these students and acknowledge their abilities—and build on their knowledge. We turn to that topic next.

Working with Families: Using the Tools of the Culture

As noted earlier in the cluster, when families are more involved in the schools, their children are more successful (Dearing et al., 2006). Some older models of parent involvement have adopted a deficit orientation—what are the parents doing wrong and how can we "fix" them? More effective models focus on equal collaboration, empowering families, and building on the assets families can offer to students, teachers, and the whole school (Albrecht, 2021). Here we consider several ways to engage families: building on funds of knowledge, Welcome Centers, and student-led conferences.

GUIDELINES

Providing Emotional Support and Increasing Self-Esteem for Students Who Are ELs

Create learning activities that promote success in all kinds of reading and writing.

Examples

1. Have weekly individual conferences with younger students and record their retelling of a story. Let students edit and revise the dictation and read it to a partner.
2. Do interactive journals with older students—collect them each week and write back.
3. Include many kinds of writing, not just academic styles of writing. For older students this could mean tweets, Facebook posts, plays, blogs, letters to the editor, or email communications with friends. For younger students you might use family stories, greeting cards, thank you notes, shopping lists—think everyday, practical writing.

Make sure students have plenty of time to practice and get careful, targeted corrections.

Examples

1. Point out privately what is correct, almost correct, and wrong in written work.
2. Be sensitive about public oral corrections, and build on what is correct, but do not accept clearly incorrect answers.

Connect teaching to relevant knowledge from students' lives.

Examples

1. Ask students to survey family members about favorite films. Use film characters to discuss elements of literature—plot, point of view, and so on.
2. Have students create construction firms and plan projects to learn math concepts.

Actively involve learners.

Examples

1. Compare timelines in history to personal timelines based on family history.
2. Do projects in science based on animals or farming for rural students.

Use different grouping strategies.

Examples

1. Try pairs for writing stories and practicing oral presentations.
2. Create small teams to research recent immigrant groups' culture and language.

Provide native language support.

Examples

1. Learn and use as much of the students' language as possible—if they can learn, so can you.
2. Find Internet translation sources and local native-speaking volunteers.
3. Bring native-language magazines and books into the classroom.

Involve family and community members.

Examples

1. Bring in storytellers, local businessowners, artists, and craftspeople.
2. Create a Welcome Center for your class.

Hold high expectations for all students, and communicate these expectations clearly.

Examples

1. Keep scrapbooks about previous students who have gone on to careers or college.
2. Don't accept mediocre work.
3. Be a model of respect for diversity and an enemy of bigotry.

Source: Based on Echevarría, J., Vogt, M., & Short, D. J. (2018). *Making content comprehensible for secondary English learners: The SIOP® Model* (3rd ed.). Boston: Pearson; and Vogt, M., & Echevarría, J. (2022). *99 ideas and activities for teaching English learners with SIOP®* (2nd ed.). Hoboken, NJ: Pearson.

FUNDS OF KNOWLEDGE AND WELCOME CENTERS. Luis Moll and his colleagues wanted a better way to teach the children of working-class Mexican American families in the barrio schools of Tucson, Arizona (Moll et al., 1992). Rather than adopt a model of remediating the students' deficits, Moll decided to identify and build on the tools and cultural **funds of knowledge** of their families. By interviewing the families, the researchers identified their extensive knowledge about agriculture, ranching, caring for animals, economics and budgeting, construction, building codes, accounting, sales, loans, labor laws, childcare, medicine, household management, appliance repair, mechanics, science, and religion. When teachers based their assignments on these funds of knowledge, students were more engaged, and teachers were educated about their students' lives. For example, by participating in a *funds of knowledge project*, one teacher realized that she always had thought about her students in terms of deficits and problems—poor achievement, alienation, family troubles, and poverty. But then she got to know the families by focusing on their resources, not their limitations. She also learned that her students' actions often were misinterpreted, as she documented in her journal. One example journal entry:

Funds of knowledge
Knowledge that families and community members have acquired in many areas of work, home, and religious life that can become the basis for teaching.

> Wednesday (11/25/92) The music teacher commented (to me), "You know, Leticia has missed two chorus rehearsals." Before I could answer, the school drama teacher stepped in to add, "Oh, she's very irresponsible." She had signed up to be in the Drama Club and had only been to two meetings. I said "Wait a minute. . . ." I then told her how Leticia's younger brother was being hospitalized for a series of operations, and when the mother had to leave, she left Leticia in charge of caring for her two younger siblings. In fact, her missing after-school rehearsals was an act of responsibility, obedience and loyalty to her family. (Gonzales et al., 1993)

By engaging with students' families, this teacher learned about the valuable cognitive resources in the community, and her respect for her students and their families increased.

Moll's work also was the basis for the *Welcome Center* project in a pre-kindergarten through fifth-grade elementary school in the Southwest. Within 4 years the school had gone from 12% to 43% Latino/a. Most of these students were recently arrived immigrants. The Welcome Center was an inviting place where recent immigrant families could meet each

other and learn by sharing expertise (DaSilva Iddings, 2009). The center was a bright, comfortable, informal space with a small kitchen, picnic tables, computer and printer, books and magazines in Spanish and English, math manipulatives, showcases for children's work, and other welcoming features. Fifth-graders offered homework assistance after school at the center. Spanish-speaking families taught classes in Spanish, cooking, and dancing for community members. English literacy activities were provided for adults and children learning together. The center produced many success stories—teachers who connected with students' families and came to appreciate the value of their students' language and culture, immigrant families who moved toward citizenship, and others who opened businesses and restaurants. Connections with families may be especially important for the success of immigrant students. The *Guidelines: Family and Community Partnerships* have more ideas.

STUDENT-LED CONFERENCES. Parent–teacher conferences have been around as long as I can remember. These can be productive but also disappointing or confrontational too. One way to get students more invested in the conferences and maybe even in learning itself is to put the students in charge of leading the conferences, presenting work to their parents, and explaining what they have learned and how they learned it. Students take more responsibility for why they succeeded and perhaps why they failed. How could they improve? What are their goals for the next marking period? When students lead conferences, parents may be more likely to attend and more engaged. With careful planning and preparation, teachers can create the sense of a team working for the good of the student (Haley & Austin, 2014).

GUIDELINES

Family and Community Partnerships

Welcoming All Families

Show respect (Vaughn et al., 2014).

Examples

1. Learn the correct pronunciation of each student's first name and family name.
2. Make sure each student's heritage is represented somewhere in the curriculum.
3. Treat the students' families with the kind of respect you expect as a parent.

Make sure communication with families is understandable.

Examples

1. Use the families' home languages wherever possible in all communications from you and your class.
2. Use oral forms of communication—phone calls or home visits—whenever possible.

Balance positive and negative messages.

Examples

1. Send home notes or descriptions about a child's accomplishments or acts of kindness.
2. Explain disciplinary actions as ways of helping children succeed.

Establish systems for welcoming new families.

Examples

1. Assign more experienced "buddy" parents to communicate with new families.
2. Connect with multilingual media in your community to make announcements about school.

Make sure messages get through.

Examples

1. Establish telephone trees or texting networks.
2. Set the expectation that you will send a weekly note home so parents ask their children about it.
3. Establish a class newsletter or website, and incorporate multiple languages.

Table 6.5 Timeline for Planning and Conducting Student-Led Conferences

WHEN	WHAT
At the beginning of the grading period	Identify several pieces of student work—projects, essays, drawings, quizzes, reports, and so on—that will be the focus of the student-led conference at the end of the grading period. Establish clear assessment criteria and perhaps a rubric for each one.
During the grading period	Have students practice self-assessment using the criteria or rubrics and share their assessments with others in the class.
A few weeks before the conferences	Send a notice to families explaining the student-led conferences and asking for information such as the child's interests, responsibilities at home, likes and dislikes about school, time spent watching TV or gaming, number and age of siblings, or hours spent on homework. You might also ask about family favorite activities, parents' interests and funds of knowledge, and their concerns and goals for their child.
A week before the conferences	Have students make final notes about how they will present their work to their families, and then role-play conferences with each other, taking the role of both parents and students.
In the week after the conferences	Ask students to reflect on what they learned while preparing for and leading their conference. How will they use the experience to guide their future learning?

There are many ways to use and design student-led conferences. Most teachers work with students to set clear learning goals for specific projects and perhaps provide rubrics to guide self-assessment (see Cluster 15 for more about rubrics). It is important to notify families well in advance and perhaps even gather information from them about their hopes and concerns for their child, their interests, and their funds of knowledge. Let them know that their child will be leading the conference and, if necessary, will be translating for them. Also assure families that there will be time at the end of the conference for them to meet with you privately, without their child, to share concerns and ask questions.

During the conference, the student leads the discussion, showing work and perhaps responding to prompts such as "What I like about this paper is…." "I learned…." "If I did this again, I would improve…." "My next goal is…." To do a good job of leading the conference and explaining their work, students should practice with each other. With all this preparation, a student will be discouraged if family members do not show up, so you should have a backup plan for another adult to sit in and engage with the student. See Table 6.5 for a timeline planning guide.

Special Challenges: Students Who Are English Learners with Unique Learning Needs and Gifts

If you remember the four profiles of ELs described earlier, you know that one type of student may have learning disabilities. Because their language is limited, ELs with disabilities are difficult to diagnose—expert assessment is necessary (Garcia & Tyler, 2010). Sometimes students are inappropriately placed in special education because they have problems with English, but other times students who would benefit from special services are denied placement because their problems are assumed to be simply language learning issues (U.S. Department of Education, 2004). In addition, students with special talents and gifts may be difficult to recognize because of their language limitations.

Students Who Are English Learners with Disabilities

As a teacher, one of your decisions will be whether to refer a struggling EL student for testing. Of course, the first step is to use the best teaching approaches, incorporating sheltered instruction to develop both subject-matter learning and English language development. But if progress seems much slower than usual, you might ask the following questions, suggested by George De George (2008): What is the student's educational background, and what is the

background of his or her family? When did the student come to the United States? Being born in the United States but speaking another language at home or immigrating when very young can make learning in the early grades more difficult. Students who immigrate after successfully learning in their home country schools have literacy skills to build on. They know some academic content, and they know they can learn in school. In contrast, the children who speak another language at home and have never been to school have no oral English to use as they learn the letters and sounds of written English. Bilingual instruction is the best strategy here.

Other questions to ask when considering a referral are: Were there any problems or complications during the mother's pregnancy? Has the student experienced any serious injuries or illnesses or moved around a great deal? Has the student had adequate opportunities to learn in a good bilingual or ESL program? Have the teachers who worked with the student been trained in teaching ESL? Is the student making progress despite being behind others the same age? Does the student have any talents or special skills to build on? These questions will help you determine if the student's difficulties are due to lack of learning opportunities, inadequate teaching, or a disability. No matter the diagnosis, attention and appropriate teaching are needed. Students who have difficulties with English are much more likely to drop out of school (U.S. Department of Education, 2004).

Reaching Every Student: Recognizing Giftedness in Bilingual Students

EL students are underrepresented in gifted programs across the United States (Mun et al., 2016). Because they may be struggling with academic English despite being very knowledgeable, bilingual students may be overlooked for gifted and talented programs. A tenth-grade boy from Mexico, in the United States for 2 years, told an interviewer in Spanish:

> High school is hard for me because my English is so limited.... There are times when I feel a lot of pressure because I want to say something, but I don't know how to say it. There are many times when the teacher is asking questions, I know the answer, but I am afraid that people might laugh at me. (Walqui, 2008, p. 104)

This student might well be gifted. Implicit beliefs about giftedness and language ability can bias how teachers view EL students. To identify bilingual students who are gifted, you can use a case study or portfolio approach in order to collect a variety of evidence, including interviews with parents and peers, formal and informal assessments (some in the student's first language), samples of student work and performances, nonverbal assessments, tests of creativity, and student self-assessments. The checklist in Table 6.6 is a useful guide.

Table 6.6 Identifying Bilingual Students with Gifts and Talents

Here are some ideas for identifying bilingual students with gifts and talents. Watch for students who:

_____	Take risks in trying to communicate in English
_____	Acquire a new language faster than a typical rate
_____	Practice English skills by themselves
_____	Initiate conversations with native English speakers
_____	Do not frustrate easily
_____	Are curious about new words or phrases and practice them
_____	Question word meanings; for example, "How can a bat be an animal and also something you use to hit a ball?"
_____	Code-switch or translate at an advanced level
_____	Are able to modify their language for less capable English speakers
_____	Read above grade level in their heritage language
_____	Prefer to work independently or with students whose level of English proficiency is higher than theirs

Table 6.6 Identifying Bilingual Students with Gifts and Talents (continued)

_____ Are able to express abstract verbal concepts with a limited English vocabulary
_____ Are able to use English in a creative way; for example, they can create puns, poems, jokes, or original stories in English
_____ Become easily bored with routine tasks or drill work
_____ Have a great deal of curiosity and problem solve in creative ways
_____ Are persistent; stick to a task
_____ Are independent and self-sufficient; assume adult responsibilities at a young age
_____ Have a long attention span
_____ Become absorbed with self-selected problems, topics, and issues
_____ Retain, easily recall, and use new information
_____ Demonstrate social maturity, especially in the home or community

Source: Based on Castellano, Jaime A., & Diaz, Eva, *Reaching new horizons: Gifted and talented education for culturally and linguistically diverse students*, © 2002; El Yaafouri, L. (2019). Identifying and supporting gifted ELLS. *Edutopia*. Available online at https://www.edutopia.org/article/identifying-and-supporting-gifted-ells.

Module 21 Summary

Teaching Immigrant Students and English Learners (pp. 266–269)

Distinguish between the terms *immigrant* and *refugee*. Immigrants are people who voluntarily leave their country to become permanent residents in a new place. Refugees are a special group of immigrants who also relocate voluntarily, but they are fleeing their home country because it is not safe.

Distinguish between the "melting pot" and multiculturalism. Statistics point to increasing cultural diversity in American society. Old views—that minority group members and immigrants should lose their cultural distinctiveness and assimilate completely in the American "melting pot" or be regarded as culturally deficient—are being replaced by new emphases on multiculturalism, equal educational opportunity, and the celebration of cultural diversity.

What is the terminology related to English learners? English learners sometimes are called limited English proficient (LEP), but this term has negative connotations and should be avoided. More often, these students are described as students who are English learners (ELs) because their primary or heritage languages are not English. The classes devoted to teaching these students English are called English as a second language (ESL) classes. Proficiency in English often means higher academic achievement and better job prospects. Therefore, one issue around diversity in language development is how we should teach these students to be successful English speakers.

What are four general profiles of students who are ELs? Students who are *balanced bilinguals* speak, read, and write well both in their first language and in English. *Monolingual/literate students* are literate in their native language (at or above grade level when working in their native language) but speak limited English. *Monolingual/preliterate students* are not literate. They may not read or write in their native language, or they might have very limited literacy skills. *Limited bilingual* students can converse well in both languages, but for some reason they have trouble learning academically. They might have underlying challenges such as learning disabilities or emotional problems.

Generation 1.5: Students in Two Worlds (pp. 269–281)

What is Generation 1.5? Generation 1.5 are students whose characteristics, educational experiences, and language fluencies are somewhere in between those of students born in the United States and students who are recent immigrants. They were not born in the United States but have lived here most of their lives because they came with their families when they were young. The language spoken in their homes may not be English, but they often speak fluent conversational English even if their academic English is not as well developed. They tend to be "ear learners" who have mastered language by listening to and interacting with the language models around them.

What is bilingual education? Although the best way to help bilingual students master English is hotly debated, studies show that students learn best when they are not forced to abandon their first language. The more proficient students are in their first language, the faster they will master the second language.

What is sheltered instruction? Sheltered instruction is one approach that has proved successful in teaching English and academic content. Sheltered instruction teaches content to students who are ELs by putting the words and concepts of the content into context to make the content more understandable. Strategies include simplifying and controlling language, giving attention to the relevant grammar and forms of English—helping students "crack the code," using visuals and gestures, and including real life supports and examples. In addition, the emphasis is on student talk and discussion instead of the teacher doing all the talking.

What are some affective and emotional/ social considerations? There are affective and emotional considerations for students who are ELs. They may experience severe challenges and stress in school. They may feel that they don't belong and that others are making fun of them or just ignoring them. Even more devastating, many immigrant students have experienced trauma in their lives before or after coming to the United States. Students might have been separated from their families and witnessed torture or the death of family members. In their new country, the students might have survived in poor housing with limited resources—all during a time when the pandemic raged in their communities. Some special school-wide programs exist to deal with trauma, but teachers can also be mindful about establishing supportive communities of learners in their classes. Building on students' families' funds of cultural knowledge and using student-led conferences are ways to make classrooms more supportive and teaching more effective.

Special Challenges: Students Who Are English Learners with Unique Learning Needs and Gifts (pp. 281–283)

How can teachers deal with the special needs of students who are English learners? As a teacher, one of your decisions will be whether to refer a struggling EL student for assessment and special services. Of course, the first step is to use the best teaching approaches, incorporating sheltered instruction to develop both subject matter learning and English language development. But if progress seems much slower than usual, you might refer the student for observation or testing. No matter what the diagnosis—attention and appropriate teaching are needed. Students who have difficulties with English are much more likely to drop out of school. And because language differences can mask giftedness, teachers should make special efforts to identify gifted bilingual and EL students.

Cluster 6 Review

Key Terms

Academic language
Balanced bilingualism
Bilingual
Code switching
Critical periods
Cultural deficit model
Dialect
Emergent literacy
English as a second language (ESL)
English learners (ELs)
Expressive vocabulary
Funds of knowledge
Genderlects
Generation 1.5
Heritage language
Immigrants
Limited English proficient (LEP)
Melting pot
Metalinguistic awareness
Monolingual
Overregularize
Pragmatics
Receptive vocabulary
Refugees
Semilingual
Sensitive periods
Sheltered instruction
Sheltered Instruction Observation Protocol (SIOP®)
Structured English immersion (SEI)
Syntax

Connect and Extend to Licensure

Multiple-Choice Questions

1. During the 1960s and 1970s, some educators suggested that students of color and students living in poverty were culturally disadvantaged. The cultural deficit model implied that students' home cultures were inferior because they failed to prepare students to fit in school. What is the current idea held by educational psychologists with respect to mismatches between students' home environments and school?

   A. Incompatibilities may exist between the students' home culture and the expectations of the school.

   B. Deficits between the home culture and the school can be compensated through special education services.

   C. Historically, the gap between the home environment and the school environment is inconsequential.

   D. There is an increasing sense that ethnic groups should want to assimilate completely into mainstream American society.

2. Ms. Carney decided to visit the Mexican families of her EL students to gain a better understanding of their backgrounds and cultures. Drawing upon the research of Luis Moll and current best practices, what do you think Ms. Carney decided to do with the new information she gained from her family visits?

   A. She shared it with her supervisors and continued to remediate the students' deficits.

   B. She made notations in her students' cumulative files about the information she gathered.

   C. She decided to identify and build on the tools and cultural funds of knowledge of her students' families.

   D. She decided not to share the information because her supervisors might not have approved of her family visits.

3. After Mr. Heney learned that his Asian EL students consider it rude to ask him questions because questioning implies that he has done a poor job of teaching, he could generalize to which one of the following assumptions?

   A. If his English learners are not asking questions, he needs to ask them why.

   B. He should always quiz his Asian students because they may not be able to understand.

   C. Asian students are always very polite, but their silence can mean they do not respect him as a teacher.

   D. Mr. Heney cannot make any generalizations about culture and learning.

4. One important way in which a teacher can motivate students is to show an interest in their lives. All but which one of the following are appropriate motivational strategies that demonstrate an interest in the lives of students from diverse backgrounds?

   A. Incorporate students' traditions into writing and language arts activities.

   B. Show respect for students' diversity by learning some key words in their language.

   C. Ask students to write a three-page essay in English about their family.

   D. Inquire about students' past experiences in their native country.

Constructed-Response Questions

Case

Nick Takis was delighted that his portfolio had helped him land his first teaching job in Texas. Although he had never been to that state, he was excited about the prospect of his own classroom. When he arrived for his 2-week induction period in August, his sunny mood began to wane when he learned that several of the students in his class were not fluent in English. To prepare for the challenge ahead, he drew upon what one of his favorite professors always suggested: "Break big projects down to bite size, and make sure you have all the information you need to make decisions."

5. What are the four general profiles of English learners in today's classroom with which Nick should familiarize himself?
6. What tips could you offer Nick that would help him promote language learning in his classroom?

What Would They Do?

Teachers' Casebook: Communicating and Creating Community in the Classroom

At the beginning of this cluster, we asked you to think critically about establishing positive relationships within an ethnically and linguistically diverse classroom. Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Anne Liners • 9th–12th-Grade English/Language Arts Student Teacher

South High School • Minneapolis, MN

Perhaps controversially, I don't see an inherent problem to students finding peer groups along lines of ethnicity and language. Kids who find comfort in friends who share backgrounds and experiences will have more positive attitudes toward school and see it as a place where they can truly belong. But, as a teacher, it is my job to make sure that kids have opportunities to learn outside of their comfort zones. That starts by making sure that we have a strong *whole class* community: students should realize that "we all do better when we *all* do better." To achieve this, teachers must be intentional about the ways students build good working relationships across the lines of their social groups. This might mean jokes the whole class is in on, lots of full-group discussions, or planned heterogeneous project groups. This also requires teaching interpersonal skills, especially when it comes to working across language, race, gender, ability, or any number of other barriers. Teachers can't ensure that their students will all leave as best friends, but we should ensure that all of our students know how to work together.

For that to happen, students should know that they are represented in the whole class community. This could mean intentionally choosing curriculum that incorporates the students' cultures, writing class rules that fit various cultural norms, and giving students opportunities to bring their own perspectives and life experiences into the classroom. Students with limited English proficiency deserve to be taught by certified English as a Second Language instructors. In the case those staff are not available, teachers should do their best to ensure that they are assessing students on their *content* knowledge instead of their language proficiency and providing language scaffolds whenever they are needed

Kyle Brown • 3rd-Grade Teacher

Hjorth Road Elementary, Surrey, British Columbia, Canada

Creating a safe and supportive community in diverse classrooms is an ongoing process that we build upon throughout the year. In my context, we begin each day softly to encourage investment in our community and to gain a greater understanding of ourselves, those around us and the ways we learn. This process is called a "soft start," which is a dedicated time each morning founded on the principles of a pedagogy of listening and social and emotional learning. With this in mind, our goal is not to complete an activity, but rather to engage by listening to each other's stories and expressing ourselves through multiple means. For a minimum of 30 minutes each morning, students have access to loose parts, which are commonly found items such as buttons, string, sticks, beads, etc., as well as various art materials such as paint, clay and pastels. Once a medium is chosen, students sit among their peers or individually to create, design, reflect and discuss. Intentionally open-ended, the materials provide an access point for the diverse range of abilities in our community and help to create moments of expression, connection and understanding among my students. This dedicated time each day builds a foundation of trusting relationships to support learning in other areas throughout the day and increases our ability to honor and understand multiple means of communication.

Maria Avila • 5th-Grade Math and Science Teacher

Stone Lakes Elementary School, Stonebrook, FL

The foundation to building trust, understanding, and a willingness to take risks in a classroom setting is the establishment of a strong classroom community. When students are able to examine perspectives other than their own, they develop a deeper appreciation and understanding of others. I am fortunate to be at a very diverse school. This past year I had a student from Brazil who did not speak English. Her native language was Portuguese. I wanted her to feel a sense of belonging, and I wanted the rest of the students to not only find ways to communicate with her but also accept her into our classroom family. So I began by labeling everyday common items in the classroom both in Portuguese and in English. During our class meetings, I used Google Translate and created a list of common phrases in English (and their translation in Portuguese). I posted these charts in the room to help the students communicate with one another. In addition, to encourage students to express themselves nonverbally, I created activities and Brain Breaks that allowed students to act out vocabulary words, portions of our reading, key concepts in science, and so on. These act it outs allowed students to perfect their communication skills. If they could not understand one another, they began improvising until they understood what the other person was trying to say. Lastly, hosting Morning Meetings whereby the students learned about the day's schedule, shared information about themselves/their family and then participated in a Brain Break facilitated a closer bond between students. We were truly able to learn about one another, which further broke down those divisions that may have existed otherwise.

Melissa Roy • 10th-Grade Reading/English Teacher

Lake Brantley High School, Altamonte Springs, Florida

My students come from a wide variety of cultural and ethnic backgrounds. Due to their many differences, building bridges between students is a critical component of our first days together. We engage in lighthearted teambuilding activities the first week and again periodically throughout the year. The joy we share as we play together promotes class bonding. Time invested in building classroom community is well spent, as it creates the foundation on which our entire year of learning is built.

To support students for whom English is a second language, I use learning strategies such as helping them link new concepts to prior knowledge, reading aloud and using audiobooks to accompany texts, and using graphic organizers to help them analyze texts. Daily practice with reading and writing are critical to growing these skills; those whose proficiency is limited can use dual language texts and write in their home language and translate later using software or a more capable peer.

It would be easy for EL students to assimilate into our culture and lose themselves at school, especially at the high school level where teenagers just want to fit in. To avoid this, I affirm students' cultural identities in the classroom and celebrate the differences between us. I begin the year by insuring we all take time to learn how to pronounce each other's names properly. We have days where we celebrate our heritage, sharing food and teaching classmates basic words in our native language. I also select texts that represent the cultures of all students and give them the opportunity to teach the class relevant background information from their perspective.

This I know for sure: When kids feel seen by both their peers and their teacher, they feel safe and are more likely to persist in the face of difficulty. And that makes all the difference.

Lauren Rollins • 1st-Grade Teacher

Boulevard Elementary School, Shaker Heights, OH

At the beginning of each school year, I set aside a significant amount of time to get to know my students, for them to get to know each other, and for them to get to know me. This is an integral part of building a classroom community. Familiarization with each group's culture is mandatory to achieve a successful outcome. It is also important that the groups of students learn to have mutual respect for each other. This is so important that it is worth suspending the curriculum until these goals are met. One activity would be to invite the students to share their backgrounds and cultures in a "show and tell" situation. Another activity would be to create "compliment charts" for each other. The students would write compliments, positive statements, and qualities that they like about each other on the charts. At the end of the activity, each student will walk away feeling respected and appreciated. It is a "feel good" activity and a big step toward respecting and appreciating the members of the classroom.

Linda Sparks • 1st-Grade Teacher

John F. Kennedy School, Billerica, MA

Students are very quick to pick up on what a person thinks about them or how someone feels about them. They need to be respected in order to learn to be respectful, while building their trust and confidence. Once that trust is earned, the students are more willing to participate in activities in the classroom. I would have to do some flexible grouping as simple as, "If you have green sneakers on, move to the left corner." They are not moving because they are of a specific ethnic group. I always have a jar with these quirky questions to move kids around, especially when I am changing desks. This also will maximize instruction because now they want their group to beat out their friends' group. When this happens, students will begin to get along socially while academic needs are being met.

Paula Colemere • Special Education, English and History Teacher

McClintock High School, Tempe, AZ

My first goal is always to create a safe learning environment for my students. To work toward this goal, I would have the class do a team-building activity. This activity would be built to show students that no matter how they look, they are much more alike than different. There is an activity I have done where students walk to the center line if they have ever experienced something. It starts simple but gets deeper. For example, the facilitator might say, "Go to the center line if you know someone who has been murdered." Sadly, many students have experienced this, and they will see they are not alone. Following this activity, I would have a discussion with the students about leaving our differences at the door. This is a teachable moment, as we will come across people throughout our lives that we don't like or who are different from us, but we have to find a way to make the relationship work to hold a job.

Jennifer Pincoski • Kindergarten–12th-Grade Learning Resource Teacher

Lee County School District, Fort Myers, FL

Establishment of an inclusive and accepting learning environment starts at the top. It is important to model understanding and acceptance by respecting students as individuals, celebrating their differences, and showing a genuine interest in their lives.

This is a good opportunity to get to know students on a more personal level. After assigning a quiet, independent task, the teacher can use this time to have brief conferences with each student one on one. Conferences should focus on becoming acquainted with the students, learning about their interests, and discussing goals. Not only does this help develop positive relationships, it also provides important information that can be used to plan future lessons and activities.

Furthermore, in an effort to get students from different cultures to interact, the teacher may need to change the physical arrangement of the room and/or reassign seats. Rather than allowing students to choose their own groups, the teacher could either assign groups randomly or purposefully group students according to strengths, interests, learning styles, and so on. Groups should change frequently, and assignments should be thoughtfully designed to complement students' individual characteristics.

Cluster 7

Behavioral Views of Learning



Holly B., Age 6, Australia

Teachers' Casebook:

Sick of Class

What Would You Do?

One of your students asks for permission to see the school nurse at least twice a week. According to the nurse, most of his complaints have been groundless. True, one time he was coming down with the flu, but 9 out of 10 times, nothing has been wrong at all. Recently you have noticed that he tends to "get sick" during oral assignments or class discussions or when he has to speak before the class. What steps would you take to deal with this situation?

Critical Thinking

- Could this be a case of a classically conditioned phobia? If so, what would you do?
- What functions might this behavior be serving?
- How would you support more positive behaviors and help the student find other ways to meet his needs?
- Would giving rewards or administering punishments be useful in this situation? Why or why not?

Overview and Objectives

We begin this cluster with a general definition of learning that takes into account the opposing views of different theoretical groups. We will highlight one group, the behavioral theorists, in this cluster and another major group, the cognitive theorists, in Clusters 8 and 9; then we will look at constructivism in Cluster 10 and social cognitive views in Cluster 11. As you can see, there are many ways to look at learning, and each has something to offer educators.

Our discussion in this cluster will focus on four behavioral learning processes: contiguity, classical conditioning, operant conditioning, and observational learning, with the greatest emphasis placed on the last two processes. After examining the implications of applied behavior analysis for teaching, we look at current directions in behavioral approaches to learning—functional behavioral assessments, positive behavior support, and self-management. Finally, we investigate Bandura's challenge to behavioral views of learning as well as other criticisms, cautions, and ethical considerations for educators.

By the time you have completed this cluster, you should be able to:

7.1 Define learning from a behavioral perspective, including ties to neuroscience and the processes involved in learning through contiguity, classical conditioning, operant conditioning, and observational learning.

7.2 Explain early views of learning through contiguity and classical conditioning and describe their implications for teaching.

7.3 Explain operant conditioning, particularly the differences and similarities between positive and negative reinforcement and presentation and removal punishment and how reinforcement schedules affect learning.

7.4 Apply behavioral approaches to modifying behavior in and out of the classroom using applied behavior analysis approaches to encourage and discourage behaviors, shaping, positive practice, contingency contracts, token reinforcement, group consequences, and the appropriate use of punishment.

7.5 Apply functional behavioral assessment, positive behavioral supports, and self-management techniques.

7.6 Evaluate contemporary challenges to behavioral theories of learning and address concerns about their application.

OUTLINE

Teachers' Casebook—Sick of Class: What Would You Do?
Overview and Objectives

MODULE 22: Behavioral Explanations of Learning
Understanding Learning
- Ethical Issues
- Learning Is Not Always What It Seems

Early Explanations of Learning: Contiguity and Classical Conditioning
Operant Conditioning: Trying New Responses
- Types of Consequences
- Neuroscience of Reinforcement and Punishment
- Reinforcement Schedules
- Antecedents and Behavior Change

MODULE 23: Applied Behavior Analysis
Putting It All Together: Applied Behavior Analysis
- Methods for Encouraging Behaviors
- Contingency Contracts, Token Reinforcement, and Group Consequences
- Handling Undesirable Behavior

MODULE 24: Current Applications of Behavioral Theories
Current Applications: Functional Behavioral Assessment, Positive Behavior Supports, and Self-Management
- Discovering the "Why": Functional Behavioral Assessments
- Reaching Every Student: Positive Behavior Supports
- Self-Management

Challenges and Criticisms
- Beyond Behaviorism: Bandura's Challenge and Observational Learning
- Criticisms of Behavioral Methods
- Behavioral Approaches: Lessons for Teachers

Cluster 7 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Sick of Class: What Would They Do?

MODULE 22 Behavioral Explanations of Learning

Learning Objective 7.1 Define learning from a behavioral perspective, including ties to neuroscience and the processes involved in learning through contiguity, classical conditioning, operant conditioning, and observational learning.

Learning Objective 7.2 Explain early views of learning through contiguity and classical conditioning, and describe their implications for teaching.

Learning Objective 7.3 Explain operant conditioning, particularly the differences and similarities between positive and negative reinforcement and presentation and removal punishment and how reinforcement schedules affect learning.

Understanding Learning

When we hear the word *learning*, most of us think of studying and school. We think about subjects or skills we intend to master—algebra, Spanish, chemistry, or karate. But learning is not limited to school. We learn every day of our lives. Babies learn to kick their legs to make the mobile above their cribs move, young people learn the lyrics to all their favorite Taylor Swift songs, middle-aged people like me (Anita in this cluster) learn to change their diet and exercise patterns, and every few years we all learn to find a new style of dress attractive when the old styles (the ones we once loved) go out of fashion. This last example shows that learning is not always intentional. We don't try to like new styles and dislike old ones; it just seems to happen that way. We don't intend to become nervous when we have to speak in public, yet many of us do. So what is this powerful phenomenon called *learning*?

In the broadest sense, **learning** occurs when experience (including practice) causes a relatively permanent change in an individual's knowledge, behavior, or potential for behavior. The change may be deliberate or unintentional, for better or for worse, correct or incorrect, and conscious or unconscious (Mayer, 2011; Schunk, 2020). To qualify as learning, this change must be brought about by experience—by the interaction of a person with his or her environment. Changes simply caused by maturation, such as growing taller or turning gray, do not qualify as learning. Temporary changes resulting from illness, fatigue, drugs, or hunger are also excluded from a general definition of learning. A person who has gone without food for 2 days does not learn to be hungry. Of course, learning plays a part in how we respond to hunger.

Learning
Process through which experience causes permanent change in knowledge or behavior.

Our definition specifies that the changes resulting from learning take place in the individual's knowledge, behavior, or potential for behavior. Most psychologists would agree with this statement, but cognitive psychologists tend to emphasize the change in knowledge, whereas behavioral psychologists focus on the change in behavior. The potential for behavior means that learning can take place even if the individual does not always act on the change. The potential is there, even if the behavior does not occur until the situation or motivation is right (Klein, 2015).

The psychologists discussed in this cluster favor **behavioral learning theories**. The behavioral view focuses on changes in behavior and emphasizes the effects of external events on the individual. Some early behaviorists such as J. B. Watson (1919) took the radical position that because thinking, intentions, and other internal mental events could not be seen or studied rigorously and scientifically, these "mentalisms," as he called them, should not even be included in an explanation of learning.

Behavioral learning theories
Explanations of learning that focus on external events as the cause of changes in observable behaviors.

Sometimes people associate behavioral explanations of learning with disturbing teaching approaches that fall under the heading of *behavior modification*, which sounds pretty bad. Behavior modification evokes images of brainwashing, punishment, and even shock therapy. As you will see in this cluster, a more accurate term for the teaching and therapy approaches based on behavioral views of learning is *applied behavior analysis* (Cooper et al., 2020). Before we explore behavioral learning theories and the strategies based on these perspectives, let's address some important ethical considerations.

Ethical Issues

The ethical questions related to the use of the strategies described in this cluster are similar to those raised by any process that seeks to influence people. What are the goals? How do these goals correspond with those of the teacher or school? What effect will a strategy have on the individuals involved? Is too much control being given to the teacher or to a majority?

GOALS. The strategies described in this cluster could be applied exclusively to teaching students to sit still, raise their hands before speaking, and remain silent at all other times (Winett & Winkler, 1972). This certainly would be an unethical use of the techniques. It is true that a teacher may need to establish some organization and order, but stopping with improvements in conduct will not ensure academic learning. On the other hand, in some situations, supporting academic learning may lead to improvements in conduct. Whenever possible, teachers should emphasize applying the strategies to academic learning. Academic improvements generalize to other situations more successfully than do changes in classroom conduct.

STRATEGIES. Punishment, discussed later in this cluster, can have negative side effects: It can serve as a model for aggressive responses, and it can encourage negative emotional reactions. Punishment is unnecessary and even unethical when positive approaches, which have fewer potential dangers, might work as well. When simpler, less restrictive procedures fail, then more complicated techniques should be tried.

A second consideration in the selection of a strategy is the impact of the strategy on the individual student. For example, some teachers arrange for students to be rewarded at home with a gift or special activities based on good work in school. But if a student has a history of being severely punished at home for bad reports from school, a home-based reward program might be very harmful to that student. Reports of unsatisfactory progress at school could lead to increased abuse at home. Keep these cautions and considerations in mind as you read about the strategies in this cluster. Before we look in depth at behavioral explanations of learning, let's step into an actual classroom and note the possible results of learning.

Learning Is Not Always What It Seems

After weeks of working with her cooperating teacher in an eighth-grade social studies class, Elizabeth was ready to take over on her own. As she moved to the front of the room, she saw another adult approach the classroom door. It was Mr. Ross, her supervisor from college. Elizabeth's neck and facial muscles suddenly became very tense.

> "I've stopped by for my first observation," Mr. Ross said. "I texted you last night to tell you, but I must have the wrong number—sorry."
>
> Elizabeth tried to hide her reaction, but her hands trembled as she gathered the notes for the lesson. She turned to face her students and introduced the day's topic.
>
> "Let's start today with a kind of game. I will say some words, then I want you to tell me the first words you can think of, and I will write them on the board. Don't all speak at once, though. Wait until someone else has finished before you say your word. OK, here is the first word: slavery."
>
> "Civil War." "Lincoln." "Freedom." "Emancipation Proclamation." The answers came quickly, and Elizabeth was relieved to see that the students understood the game.
>
> "All right, very good," she said. "Now try another one: South."
>
> "South Carolina." "South Dakota." "South Park." "No, the Confederacy." "Slavery." "*Free State of Jones*." "Matthew McConaughey." With this last answer, a ripple of laughter moved across the room.
>
> "Matthew McConaughey!" Elizabeth sighed dreamily. Then she laughed too. Soon all the students were laughing. "OK, settle down," Elizabeth said. "Here is another word: North."

"Bluebellies." The students continued to laugh. "Jelly Bellies." "Belly dancers." More laughter and a few inappropriate gestures.

"Just a minute," Elizabeth pleaded. "These ideas are getting a little off base!"

"Off base? Baseball," shouted the boy who had first mentioned Matthew McConaughey. He stood up and started throwing balls of paper to a friend in the back of the room, simulating the style of Shohei Ohtani.

"The LA Angels." "Ball games." "Hot dogs." "Popcorn." "Movies." "*Free State of Jones*." "Matthew McConaughey." The responses now came too fast for Elizabeth to stop them. For some reason, the "Matthew McConaughey" line got an even bigger laugh the second time around, and Elizabeth suddenly realized she had lost the class.

"OK, because you know so much about the Civil War, close your books and take out a pen," Elizabeth said, obviously angry. She passed out the worksheet that she had planned as a cooperative, open-book project. "You have 20 minutes to finish this test!"

"You didn't tell us we were having a test!" "This isn't fair!" "We haven't even covered this stuff yet!" "I didn't do anything wrong!" There were moans and disgusted looks, even from the most mellow students. "I'm reporting you to the principal; it's a violation of students' rights!"

This last comment hit hard. The class had just finished discussing human rights as preparation for this unit on the Civil War. As she listened to the protests, Elizabeth felt terrible. How was she going to grade these "tests"? The first section of the worksheet involved facts about events during the Civil War, and the second section asked students to create a news-style program interviewing ordinary people touched by the war.

"All right, all right, it won't be a test. But you do have to complete this worksheet for a grade. I was going to let you work together, but your behavior this morning tells me that you are not ready for group work. If you can complete the first section of the sheet working quietly and seriously, you may work together on the second section." Elizabeth knew that her students would like to work together on writing the script for the news interview program.

Elizabeth was afraid to look back at her supervisor. What was he writing on his observation form?

It appears, on the surface at least, that very little learning of any sort was taking place in Elizabeth's classroom. Elizabeth had some good ideas, but she also made some mistakes in her application of learning principles. We will return to this episode several times in the cluster to analyze various aspects of what took place. To get us started, four events can be singled out, each possibly related to a different learning process.

Contiguity
Association of two events because of repeated pairing.

First, the students were able to associate the words *Carolina, Dakota*, and *Park* with the word *South*. Second, Elizabeth's hands trembled when her college supervisor entered the room. Third, one student continued to disrupt the class with inappropriate responses. And fourth, after Elizabeth laughed at a student's comment, the class joined in her laughter. The four learning processes represented are contiguity, classical conditioning, operant conditioning, and observational learning. In the following pages we will examine these four kinds of learning, starting with contiguity.

Early Explanations of Learning: Contiguity and Classical Conditioning

One of the earliest explanations of learning came from Aristotle (384–322 B.C.). He said that we remember things together (a) when they are similar, (b) when they contrast, and (c) when they are contiguous. This last principle is the most important because it is included in all explanations of *learning by association*. The principle of **contiguity** states that when two or more sensations are experienced together often enough, they will become associated.

Stimulus
Event that activates behavior.

Response
Observable reaction to a stimulus.

Later, when only one of these sensations (a **stimulus**) occurs, the other will be remembered too (a **response**) (Gluck et al., 2020; Klein, 2015). For example, when Elizabeth said "South," her students associated the words "Carolina," "Dakota," and "Park." They had heard these words used together many times. Other processes may also be involved when students learn these phrases, but contiguity is a factor. Contiguity also plays a major role in another learning process best known as *classical conditioning*.

Stop & Think Close your eyes and focus on a vivid image of the following: the smell of French fries cooking. A time you were really embarrassed in school. The taste of chocolate fudge. The sound of a dentist's drill. What did you notice as you formed each of these images?

If you are like me, imagining the sound of the dentist's drill tightens your neck muscles. I can actually salivate when I imagine salty fries or smooth rich chocolate (especially because it is 11:50 a.m. and breakfast was a piece of toast). The first embarrassing school incident I remembered was falling flat as I did a cartwheel in front of the whole high school. A small cringe still accompanies the memory. **Classical conditioning** focuses on the learning of involuntary emotional or physiological responses such as fear, increased muscle tension, salivation, or sweating. These sometimes are called **respondents** because they are automatic responses to stimuli. Through the process of classical conditioning, humans and animals can be trained to react involuntarily to a stimulus that previously had no effect—or a very different effect—on them. The stimulus comes to elicit, or bring forth, the response automatically.

Classical conditioning
Association of automatic responses with new stimuli.

Respondents
Responses (generally automatic or involuntary) elicited by specific stimuli.

Classical conditioning was discovered in the 1920s by Ivan Pavlov, a Russian physiologist who was trying to determine how long it took a dog to salivate after it had been fed. But the intervals of time kept changing. At first, the dogs salivated as expected while they were being fed. Then the dogs began to salivate as soon as they saw the food, and finally they salivated as soon as they heard the scientists' footsteps in the hall outside the lab. Pavlov decided to make a detour from his original experiments and examine these unexpected interferences or "psychic reflexes," as he called them at first.

In one of his early experiments, Pavlov began by making a sound—for example, with a buzzer—and recording a dog's response. As expected, there was no salivation. At this point, the sound was a **neutral stimulus** because it brought forth no salivation. Then Pavlov fed the dog. The response was salivation. The food was an **unconditioned stimulus (US)** because no prior training or "conditioning" was needed to establish the natural connection between food and salivation. The salivation was an **unconditioned response (UR)**, again because it was elicited automatically—no conditioning required.

Neutral stimulus
Stimulus not connected to a response.

Unconditioned stimulus (US)
Stimulus that automatically produces an emotional or physiological response.

Unconditioned response (UR)
Naturally occurring emotional or physiological response.

Using these three elements—the food, the salivation, and the sound of the buzzer—Pavlov demonstrated that a dog could be *conditioned* to salivate after hearing the sound. He did this by *contiguous* pairing of the sound with food. He sounded the buzzer and then quickly fed the dog. After Pavlov repeated this several times, the dog began to salivate after hearing the sound but before receiving the food. Now the sound (like the sound of scientists' footsteps in the hall) had become a **conditioned stimulus (CS)** that could bring forth salivation by itself. The response of salivating after the buzzer was now a **conditioned response (CR)**. One explanation for how this occurs focuses on expectations or predictability—the dog learns that the previously neutral stimulus (the sound of the buzzer) now *predicts* the appearance of the US (the food), so the animal responds to the sound with an anticipatory response (salivating)—getting ready for or anticipating the food. The association or conditioning of the sound to salivating will occur as long as the sound is information that helps the dog's brain predict "food is on the way." So classical conditioning is basically about predicting future events that we don't control, which is a very useful skill for survival. For example, perhaps our earliest ancestors ate a little bit of a poisonous food that made them sick and then they got sick just smelling the food, thus saving them from eating the deadly food in the future (Gluck et al., 2020; O'Doherty et al., 2017).

Conditioned stimulus (CS)
Stimulus that evokes an emotional or physiological response after conditioning.

Conditioned response (CR)
Learned response to a previously neutral stimulus.

If you believe that Pavlovian conditioning is of historical interest only, think about how much advertising relies on pairing a particular attribute with some product. For example, George Clooney (*People* magazine's "sexiest man alive," 2006) endorsed a coffee brand, so did

George make drinking that coffee sexy and sophisticated? The advertisers hope you think so (Unkelbach & Högden, 2019). Consider this excerpt from *USA Today* describing an advertising campaign for products aimed at "Gen Y," those people born between 1977 and 1994:

> Mountain Dew executives have their own term for this [advertising strategy]: the Pavlovian connection. By handing out samples of the brand at surfing, skateboard and snowboard tournaments, "There's a Pavlovian connection between the brand and the exhilarating experience," says Dave Burwich, a top marketing executive at Pepsi, which makes Mountain Dew. (Horovitz, 2002, p. B2)

Maybe they could hand out math homework too!

It is possible that many of our emotional reactions to various situations are learned in part through classical conditioning. Physicians have a term, *white coat syndrome*, that describes people whose blood pressure (an involuntary response) goes up when it is tested in the doctor's office, usually by someone in a white coat. Another example, Elizabeth's trembling hands when she saw her college supervisor, might be traced to unpleasant experiences during past evaluations of her performance. Now just the thought of being observed elicits a pounding heart and sweaty palms. Remember the student at the beginning of this cluster who got sick before oral presentations? He may have been conditioned to experience unpleasant physiological reactions to public speaking. Classical conditioning has implications for teachers as well as marketing managers. Remember that emotions and attitudes as well as facts and ideas are learned in classrooms. This emotional learning can sometimes interfere with academic learning. Procedures based on classical conditioning also can be used to help people learn more adaptive emotional responses, as the *Guidelines: Applying Classical Conditioning* suggest.

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Learning by Association (I, A1)

Quite a bit of classroom learning can be attributed to contiguity (i.e., learning by association). What are some things that you might have learned because your teacher paired certain stimuli (e.g., names of the letters of the alphabet)?

GUIDELINES

Applying Classical Conditioning

Associate positive, pleasant events with learning tasks.

Examples

1. Emphasize group competition and cooperation over individual competition. Many students have negative emotional responses to individual competition that may generalize to other learning.
2. Make division drills fun by having students decide how to divide refreshments equally and then letting them eat the results.
3. Make voluntary reading appealing by creating a comfortable reading corner with pillows, colorful displays of books, and reading props such as puppets.

Help students to risk anxiety-producing situations voluntarily and successfully.

Examples

1. Assign a shy student the responsibility of teaching two other students how to distribute materials for map study.
2. Devise small steps toward a larger goal. For example, give ungraded practice tests daily and then weekly to students who tend to "freeze" in test situations.
3. If a student is afraid of speaking in front of the class, let the student read a report to a small group while seated, then read it while standing, and then give the report from notes instead of reading it verbatim. Next, move in stages toward having the student give a report to the whole class.

Help students recognize differences and similarities among situations so they can discriminate and generalize appropriately.

Examples

1. Explain that it is appropriate to avoid strangers who offer gifts or rides but safe to accept favors from adults when parents are present.
2. Assure students who are anxious about taking college entrance exams that these tests are like all the other achievement tests they have taken.

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Basics of Operant Conditioning (I, A1)

Be able to explain learning from the behavioral perspective. Incorporate concepts of classical and operant conditioning into your explanation. Have a firm grasp of the effects of reinforcement schedules on learning.

Operant Conditioning: Trying New Responses

So far, we have concentrated on the automatic conditioning of reflex-like responses such as salivation, fear, and feeling sexy when you drink a certain brand of coffee. Clearly, not all human learning is so unintentional, and not all responses or behaviors are so automatic. People actively "operate" on their environment. These deliberate actions are called **operants**. The learning process involved in operant behavior is called **operant conditioning** because we learn to behave in certain ways as we operate on the environment.

The person generally thought to be responsible for developing the concept of operant conditioning is Burrhus Frederic (B. F.) Skinner (1904–1990). Growing up in rural Pennsylvania, he had hoped to be a writer after college but settled for graduate school in psychology—proof that sometimes second choices work out really well! Skinner is one of the best-known psychologists in the world. He began with the belief that the principles of classical conditioning account for only a small portion of learned behaviors. Classical conditioning may help a dog prepare for the arrival of food (by salivating), but it won't help the dog find its next meal (Gluck et al., 2020). Classical conditioning describes only how existing responses might be paired with new stimuli; it does not explain the much more common learning of new operant behaviors.

Behavior, like *response* or *action*, is simply a word for what a person does in a particular situation. (Please note that we use the words *behavior* and *response* to mean the same thing throughout this book.) Conceptually, we may think of a behavior as sandwiched between two sets of environmental influences: those that precede it (its **antecedents**) and those that follow it (its **consequences**) (Skinner, 1950, 1953). This relationship can be shown very simply as antecedent–behavior–consequence, or A–B–C (Kazdin, 2008). As behavior is ongoing, a given consequence becomes an antecedent for the next A–B–C sequence. Research in operant conditioning shows that operant behavior can be altered by changes in the antecedents, the consequences, or both. Early work focused on consequences, often using rats or pigeons as subjects.

Operants
Voluntary (and generally goal-directed) behaviors emitted by a person or an animal.

Operant conditioning
Learning in which voluntary behavior is strengthened or weakened by consequences or antecedents.

Antecedents
Events that precede an action.

Consequences
Events that follow an action.

Types of Consequences

Stop & Think Think back over teachers you have had who used rewards or punishments.

Try to remember different types of rewards:

Concrete rewards (stickers, food, prizes, certificates)
Activity rewards (free time, puzzles, free reading, computer game time)
"Exemption" rewards (no homework, no weekly test)
Social rewards (praise, recognition, leadership roles)

What about punishments?

Loss of privileges (cannot sit where you want, cannot work with friends)
Fines (lost points, grades, money)
Extra work (homework, laps, push ups)

According to the behavioral view, consequences determine to a great extent whether a person will repeat the behavior that led to the consequences. The type and timing of consequences can strengthen or weaken behaviors. First, let's consider the consequences that strengthen behavior.

Reinforcement
Use of consequences to strengthen behavior.

Reinforcer
Any event that follows a behavior and increases the chances that the behavior will occur again.

REINFORCEMENT. Although **reinforcement** is commonly understood to mean "reward," this term has a particular meaning in psychology. A **reinforcer** is *any* consequence that strengthens the behavior it follows. So, by definition, reinforced behaviors increase in frequency or duration—that is, *how often* or *how long* the behaviors occur. Whenever you see a behavior persisting or increasing over time, you can assume the consequences of that

behavior are reinforcers for the individual involved (Alberto & Troutman, 2017; Cooper et al., 2020). The reinforcement process can be diagrammed as follows:

	CONSEQUENCE	EFFECT
Behavior ⟶	Reinforcer ⟶	Strengthened or repeated behavior

We can be fairly certain that food will be a reinforcer for a hungry animal, but what about people? Whether the consequences of any action are reinforcing probably depends on the individual's perception of the event and the meaning it holds for her or him. For example, students who repeatedly get sent to the principal's office for misbehaving may be indicating that something about this consequence is reinforcing for them, even if it doesn't seem desirable to you. By the way, Skinner did not speculate about why reinforcers increase behavior. He believed that it is useless to talk about "imaginary constructs" such as perceptions or meaning. Skinner simply described the tendency for a given operant behavior to increase after certain consequences (Skinner, 1953, 1989).

Positive reinforcement
Strengthening behavior by presenting a desired stimulus after the behavior.

Negative reinforcement
Strengthening behavior by removing an aversive stimulus when the behavior occurs.

There are two types of reinforcement (Cooper et al., 2020). The first, called **positive reinforcement**, occurs when the behavior or response leads to the *appearance or presentation* of a new stimulus. Examples of positive reinforcement include the behavior of a pigeon pecking on the red key leading to the appearance of food, a student falling out of his chair leading to cheers and laughter from classmates, or wearing a new outfit leading to compliments.

Notice that positive reinforcement can occur even when the response being reinforced (falling out of a chair) is not "positive" from the teacher's point of view. Positive reinforcement of inappropriate responses occurs unintentionally in many classrooms. Teachers help maintain problem behaviors by inadvertently reinforcing them. For example, Elizabeth may have unintentionally reinforced problem responses in her class by laughing the first time the boy answered, "Matthew McConaughey." The problem behavior may have persisted for other reasons, but the consequence of Elizabeth's laughter could have played a role.

When the consequence that strengthens a behavior is the *presentation* (addition) of a new stimulus, the situation is defined as *positive reinforcement*. In contrast, when the consequence that strengthens a behavior is the *removal* (subtraction) of a stimulus, the process is called **negative reinforcement**. If a particular action leads to avoiding or escaping an aversive situation, the action is likely to be repeated in a similar situation. A common example is the car seat belt buzzer. As soon as you buckle your seat belt, the irritating buzzer stops. The process is *reinforcement* because you *repeat* this "buckling up" action in the future. The kind of reinforcement is *negative* because the buckling up behavior *removed* (subtracted) an aversive buzzing stimulus.

Consider our opening case student who continually "gets sick" right before an oral presentation and then is sent to the nurse's office. This behavior allows him to escape aversive situations—public speaking—so getting "sick" is being maintained, in part, through negative reinforcement. It is negative because getting sick *removed* the unpleasant stimulus (the oral report); it is reinforcement because the behavior that removed the stimulus (getting "sick") increases or repeats in the future.

It is important to remember that the "negative" in "negative reinforcement" *does not* imply that the behavior being reinforced is necessarily negative or bad. The meaning is closer to that of "negative" numbers—*something is subtracted*. Try to associate positive and negative reinforcement with the *consequence* of *adding* or *subtracting* something following a behavior. That adding or subtracting has the *effect* of strengthening (reinforcing) the behavior.

PUNISHMENT. Negative reinforcement is often confused with punishment. To avoid this mistake, remember that the process of reinforcement (positive or negative) always involves *increasing* or *strengthening* behavior. **Punishment**, on the other hand, always involves *decreasing* or *suppressing* behavior. A behavior followed by a punisher is less likely to be repeated in similar situations in the future. Again, it is the effect that defines a consequence as punishment, and different people have different perceptions of what is punishing. One student may find suspension from school punishing, whereas another student wouldn't mind the break at all. The process of punishment is diagrammed as follows:

Punishment
Process that weakens or suppresses behavior.

	CONSEQUENCE	EFFECT
Behavior ⟶	Punisher ⟶	Weakened or decreased behavior

Presentation punishment
Decreasing the chances that a behavior will occur again by presenting an aversive stimulus following the behavior; also called *Type I punishment*.

Removal punishment
Decreasing the chances that a behavior will occur again by removing a pleasant stimulus following the behavior; also called *Type II punishment*.

Like reinforcement, punishment may take one of two forms. The first type has been called Type I punishment, but this name isn't very informative, so we use the term **presentation punishment**. It occurs when presenting (adding) a stimulus following the behavior has the effect of suppressing or decreasing the behavior. When teachers reprimand students, assign extra work, or make students run extra laps, and so on, they are using presentation punishment. We call the other type of punishment (Type II) **removal punishment** because it involves removing (subtracting) a stimulus. When teachers or parents take away privileges after a young person has behaved inappropriately, they are applying removal punishment. With both types, the effect is to decrease the behavior that led to the punishment. Figure 7.1 summarizes the processes of reinforcement and punishment.

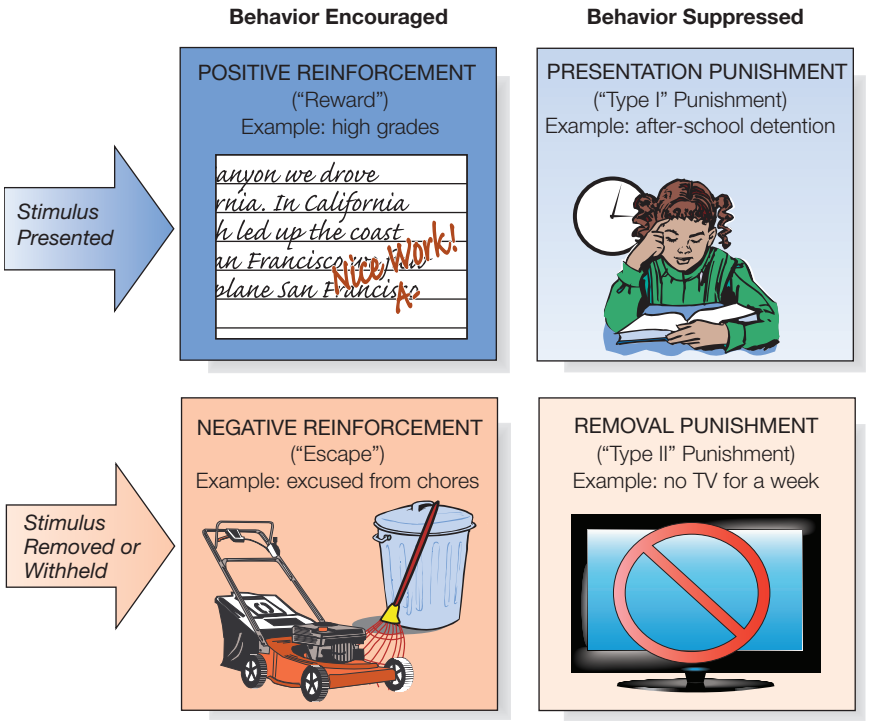
Neuroscience of Reinforcement and Punishment

Why do reinforcement and punishment work? There are many theories. For example, some psychologists suggest that reinforcers are preferred activities or that they satisfy needs, whereas other psychologists believe that reinforcers reduce tension. You saw in Cluster 3 that we are learning more and more about the brain. Researchers conducting animal and human studies have discovered quite a bit about the areas of the brain involved with learning new behaviors. For example, parts of the cerebellum are involved in simple reflex learning, like learning to blink following a particular tone, and other parts of the brain are involved in learning how to avoid painful stimulation such as a shock (Klein, 2015; Schwartz et al., 2002).

Other lines of research ask why animals and people will behave in certain ways to gain stimulation or reinforcers. Stimulation to certain parts of the brain will cause hungry rats to ignore food and keep doing whatever it takes to keep the stimulation coming. These same brain systems are associated with the pleasures people experience from many things, including food and music. It is likely that many parts of the brain and complex patterns of activity allow us to enjoy some experiences. It now appears that some systems of the brain signal "liking"

Figure 7.1 Kinds of Reinforcement and Punishment

Negative reinforcement and punishment are often confused. It may help you to remember that reinforcement is always associated with increases in behaviors, and punishment always involves decreasing or suppressing behavior.



something, while other brain systems are involved with motivation—how much we "want" something or how hard we would work for it. The brain chemical *dopamine* is involved with wanting a reinforcer. The brain also produces its own opiate-like chemicals that are involved with liking a reinforcer. The rats ignoring food and working hard for electrical stimulation likely "wanted" the stimulation more than they wanted food, even though they still "liked" food. If a consequence affects both the wanting and the liking systems in the brain, then that consequence could be a strong reinforcer (Gluck et al., 2020). There also is evidence that students growing up in low-income neighborhoods who have decreased access to many rewards show reduced activity in the areas of their brain related to anticipating rewards. The causes are not clear, but impaired reward-motivated behavior is associated with devastating consequences throughout adolescence such as criminality and drug misuse (Mullins et al., 2020).

Reinforcement Schedules

When individuals are learning a new behavior, they will learn it faster if they are reinforced for every correct response. This is a **continuous reinforcement schedule**. Then, when they have mastered the new behavior, they will maintain it best if they are reinforced intermittently, now and then, rather than every time. An **intermittent reinforcement schedule** helps students to maintain skills without expecting constant reinforcement. True story—Skinner discovered the power of intermittent schedules one weekend when he realized he didn't have enough food pellets to reinforce his rats for every successful trial. Rather than getting more food, he tried spreading out the reinforcers—after two or three correct trials instead of every correct trial. The rats still performed well. This surprising outcome "reinforced" Skinner's increased focus on the timing and predictability of reinforcement, which led to research on reinforcement schedules (Gluck et al., 2020).

There are two basic types of intermittent reinforcement schedules. One—called an **interval schedule**—is based on the amount of time that passes between reinforcers. The other—a **ratio schedule**—is based on the number of responses learners give between reinforcers. Interval and ratio schedules may be either fixed (predictable) or variable (unpredictable). Table 7.1 on the next page summarizes the five possible reinforcement schedules (the continuous schedule and the four kinds of intermittent schedules).

Continuous reinforcement schedule
Presenting a reinforcer after every appropriate response.

Intermittent reinforcement schedule
Presenting a reinforcer after some but not all responses.

Interval schedule
Length of time between reinforcers.

Ratio schedule
Reinforcement based on the number of responses between reinforcers.

Table 7.1 Five Reinforcement Schedules

SCHEDULE	DEFINITION	EXAMPLE	RESPONSE PATTERN	REACTION WHEN REINFORCEMENT STOPS
Continuous	Reinforcement after every response	Turning on the television; buying candy from a vending machine	Rapid learning of response	Very little persistence; response disappears quickly
Fixed-interval	Reinforcement after a set period of time	Studying as weekly quiz approaches; dishwashing cycle (dishes are clean after a specific time period)	Response rate increases as time for reinforcement approaches, then drops after reinforcement	Little persistence; response disappears quickly when time for reinforcement passes and no reinforcer appears
Variable-interval	Reinforcement after varying lengths of time	Pop quizzes; texting (get an answer after variable time periods); birding (variable times between spotting a new kind of bird)	Slow, steady rate of responding; very little pause after reinforcement	Greater persistence; slow decline in response rate
Fixed-ratio	Reinforcement after a set number of responses	Telemarketer gets a bonus after every 100 credit cards enrolled; bake sale	Rapid response rate; pause after reinforcement	Little persistence; rapid drop in response rate when expected number of responses are given and no reinforcer appears
Variable-ratio	Reinforcement after a varying number of responses	Slot machines	Very high response rate; little pause after reinforcement	Greatest persistence; response rate stays high and gradually drops off

Source: Based on information in Alberto, P. A., & Troutman, A. C. (2017). *Applied behavior analysis for teachers* (9th ed.). Boston, MA: Pearson; Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied behavior analysis* (3rd ed.). Hoboken, NJ: Pearson.

What are the effects of different schedules? Speed of performance depends on control. If reinforcement is based on the number of responses you give, then you have more control over the reinforcement: The faster you accumulate the correct number of responses, the faster the reinforcement will come. A teacher who says, "As soon as you complete these 10 problems correctly, you may use your class iPad," can expect higher rates of performance than a teacher who says, "Work on these 10 problems for the next 20 minutes. Then I will check your papers, and those with 10 correct may use your class iPad."

Persistence in performance depends on unpredictability. Continuous reinforcement and both kinds of fixed reinforcement (ratio and interval) are quite predictable. We come to expect reinforcement at certain points and are generally quick to give up when the reinforcement does not meet our expectations. To encourage persistence of response, variable schedules are most appropriate. A great example of student persistence on a variable schedule was presented in an article about Valorie Lewis, a member of the *USA Today* All-USA teacher team. Describing Lewis's third-grade class, one of her colleagues said that the students are "afraid to be absent because they don't want to take the chance they will miss anything. Mrs. Lewis doesn't tell them when she is planning something special, so they have to be there every day just in case" (S. Johnson, 2008, p. 7D). If the reinforcement schedule is gradually changed until it becomes very "lean"—meaning that reinforcement occurs only after many responses or after a long time interval—then people can learn to work for extended periods without any reinforcement at all. Just watch gamblers playing slot machines to see how powerful a lean reinforcement schedule can be.

Reinforcement schedules influence how persistently we will respond when reinforcement is withheld. What happens when reinforcement is completely withdrawn?

EXTINCTION. In *classical conditioning*, the CR (conditioned response) is extinguished (disappears) when the CS (conditioned stimulus) appears, but the US (unconditioned stimulus) does not follow—if sound but no food, then salivation after the sound finally disappears. In *operant conditioning*, a person or an animal will not persist in a certain behavior if the usual reinforcer is withheld long enough. The behavior will eventually be extinguished (stop). For example, if you repeatedly text someone but never get a reply, you may give up texting that person. Removal of reinforcement altogether leads to **extinction**. The process may take a while, however, as you know if you have tried to extinguish a child's tantrums by withholding your attention. Often the child wins—because you give up ignoring her—and instead of extinction, intermittent reinforcement occurs. This, of course, may encourage even more persistent tantrums in the future.

Extinction
The disappearance of a learned response.

Antecedents and Behavior Change

Stimulus control
Capacity for the presence or absence of antecedents to cause behaviors.

In operant conditioning, *antecedents*—the events preceding behaviors—provide information about which behaviors will lead to positive consequences and which will lead to unpleasant ones. Skinner's pigeons learned to peck for food when a light was on but not to bother when the light was off because no food followed pecking when the light was off. In other words, they learned to use the antecedent light as a cue to predict the likely consequence of pecking. The pigeons' pecking was under **stimulus control**—controlled by the discriminative stimulus of the light. This happens in humans, too. For example, I found myself, more than once, about to turn into my old office parking lot even after my department had been relocated to a new building across town. As I drove, the old landmark cues kept me heading automatically to the old office. Another example is the supposedly true story of a getaway car driver in a bank robbery who sped through town, only to be caught by the police when she dutifully stopped at a red light. The stimulus of the red light had come to have automatic control. We all learn to discriminate—to read situations. When should you ask to borrow your roommate's car—after a major disagreement or after you both have had a great time at a party? Teachers can use cues deliberately in the classroom.

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Antecedents (I, A1)

Understand how antecedents can affect learning. Be particularly familiar with the effective uses of cueing.

Table 7.2 Using Effective Instruction Delivery (EID)

EID is an evidence-based procedure for increasing the extent to which students comply with adult instructions. EID includes having adults change the manner in which they deliver instructions to students. Below are specific directions for using EID:

- Remain in close proximity to the student (i.e., be within 5 feet of the student as opposed to the other side of the room)
- Request eye contact (e.g., "Brad, look at me please")
- Praise students when they provide eye contact (e.g., "Thanks for looking at me")
- Deliver instructions using a directive as opposed to a question (e.g., "Listen carefully to this next sentence" versus "Can you pay attention?")
- Be descriptive when you deliver an instruction (e.g., "Turn your phone off and put it in your backpack" versus "Put that away")
- Allow 5 seconds for the student to initiate and comply with your instruction
- Praise students when they comply with your instructions (i.e., "Good job returning to your seats quickly and quietly!")

Example:

"Brad, look at me. Wonderful Brad, I have your attention! Begin working on your math worksheet.

{5-second wait to comply} Awesome! Thanks for getting started on your math worksheet quickly."

Source: LaBrot, Z. C., Kupzyk, S., Strong-Bak, W., Pasqua, J. L., & Mahon, J. (2020). Examination of group-based behavioral skills training for parents of children with intellectual and neurodevelopmental disorders. *Child & Family Behavior Therapy*.

EFFECTIVE INSTRUCTION DELIVERY. One important antecedent to increase positive student responses is the type of instructions you give. Research on **effective instruction delivery (EID)** has found instructions that are concise, clear, and specific and that communicate an expected result are more effective than vague directions. Statements work better than questions. You should be within a few feet of the students; directions shouted from across the room are less likely to work. Ideally, you should make eye contact with the students first and then give the directions (Radley & Dart, 2016). Zachary LaBrot and his colleagues (2018, 2020) successfully trained parents how to use EID with their children who had intellectual and developmental disorders using the guidelines in Table 7.2. These are good guides for teachers too.

Effective instruction delivery (EID)
Instructions that are concise, clear, and specific and that communicate an expected result. Statements work better than questions.

CUEING. By definition, **cueing** is the act of providing an antecedent stimulus just before a specific behavior is supposed to take place. Cueing is particularly useful in setting the stage for behaviors that must occur at a given time but are easily forgotten. In working with young people, teachers often find themselves correcting behaviors after the fact, asking students, "When are you going to start remembering to…?" These reminders often lead to irritation. The mistake is already made, and the young person is left with only two choices: to promise to try harder or to think, "Why don't you leave me alone?" Neither response is very satisfying. Presenting a nonjudgmental cue can help prevent such negative confrontations. For example, before a test, an educational psychology instructor might say, "Remember, people often confuse negative (subtraction) reinforcement and punishment. Some of the questions on this exam will test your understanding of the differences." When students do well on the test, the instructor can reinforce the students' accomplishments instead of saying, "You still don't get it…" (Alberto & Troutman, 2017).

What would these principles look like in action? We turn to that next.

Cueing
Providing a stimulus that "sets up" a desired behavior.

Module 22 Summary

Understanding Learning (pp. 291–293)

What is learning? Although theorists disagree about the definition of learning, most would agree that learning occurs when experience causes a change in a person's knowledge or behavior. Changes simply caused by maturation, illness, fatigue, or hunger are excluded from a general definition of learning. Behavioral theorists emphasize the role of environmental stimuli in learning and focus on behavior—observable responses. Behavioral learning processes include contiguity learning, classical conditioning, operant conditioning, and observational learning.

Early Explanations of Learning: Contiguity and Classical Conditioning (pp. 293–295)

How does a neutral stimulus become a CS? In classical conditioning, which was discovered by Pavlov, a previously neutral stimulus is repeatedly paired with a stimulus that evokes an emotional or physiological response. Later, the previously neutral stimulus alone evokes the response—that is, the neutral stimulus is conditioned to bring forth a CR. The neutral stimulus has become a CS.

What are some everyday examples of classical conditioning? Here are a few—you can add your own: salivating when you smell your favorite foods, feeling tension when you hear a dentist's drill, experiencing nervousness when you step onstage, becoming nervous when you step on an airplane.

Operant Conditioning: Trying New Responses (pp. 296–301)

What defines a consequence as a reinforcer? As a punisher? According to Skinner's concept of operant conditioning, people learn through the effects of their deliberate responses. For an individual, the effects of consequences following an action may serve as either reinforcers or punishers. A consequence is defined as a reinforcer if it strengthens or maintains the response that brought it about, but it is defined as a punishment if it decreases or suppresses the response that brought it about.

Negative reinforcement is often confused with punishment. How are they different? The process of reinforcement (positive or negative) always involves strengthening behavior. The teacher strengthens (reinforces) desired behaviors by removing something aversive as soon as the desired behaviors occur. Because the consequence involves removing or "subtracting" a stimulus, the reinforcement is negative. Punishment, on the other hand, involves decreasing or suppressing behavior. A behavior followed by a "punisher" is less likely to be repeated in similar situations in the future.

How can you encourage persistence in a behavior? Ratio schedules (based on the number of responses) encourage higher rates of response, and variable schedules (based on varying numbers of responses or varying time intervals) encourage persistence of responses.

What a cueing? Cueing is the act of providing an antecedent stimulus just before a specific behavior is supposed to take place. Cueing is particularly useful in setting the stage for behaviors that must occur at a given time but are easily forgotten.

MODULE 23 Applied Behavior Analysis

Learning Objective 7.4 Apply behavioral approaches to modifying behavior in and out of the classroom using applied behavior analysis approaches to encourage and discourage behaviors, shaping, positive practice, contingency contracts, token reinforcement, group consequences, and the appropriate use of punishment.

Putting It All Together: Applied Behavior Analysis

Applied behavior analysis
The application of behavioral learning principles to understand and change behavior.

The behavioral approach to learning has inspired several important contributions to instruction, including systems for specifying learning targets and direct instruction (we will look at these topics in Cluster 14 when we discuss teaching) and class management systems such as group consequences, contingency contracts, and token economies. These approaches are useful when the goal is to learn explicit information or change behaviors and when the material is sequential and factual. **Applied behavior analysis** is the application of behavioral learning principles to change behavior in these kinds of situations (Alberto & Troutman, 2017; Cooper et al., 2020; Kazdin, 2008).

Ideally, applied behavior analysis requires clear specification of the behavior to be changed, careful measurement of the behavior, analysis of the antecedents and consequences that might be maintaining inappropriate or undesirable behavior, interventions based on behavioral principles to change the behavior, and careful measurement of changes. In research on applied behavior analysis, an ABAB design (described in Cluster 1) is common. That is, researchers take a baseline measurement of the behavior (A), then apply the intervention (B), then stop the intervention to see if the behavior goes back to the baseline level (A), and then reintroduce the intervention (B).

In classrooms, teachers usually cannot follow all the ABAB steps, but they can do the following:

1. Clearly *specify* the behavior to be changed and the goal. For example, if the student makes "careless" errors in computation, is your goal only one error for every 10 problems? For every 20 problems?
2. Carefully *observe* and note the current level of the behavior. How many errors per 10 or 20 problems now? What seems to be the reason or cause for the errors? Are there more errors on timed tests? Homework? Group work? Does time of day matter?
3. Plan a specific *intervention* using antecedents, consequences, or both. For example, offer the student 1 extra minute of computer time for every problem completed with no computation errors.
4. Keep track of the *results*, and *modify* the plan if necessary.

Let's consider some specific methods for accomplishing step 3—the intervention.

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Applied Behavior Analysis (I, C4)

When teachers need to change inappropriate or ineffective classroom behaviors that have not changed in response to standard behavioral techniques (e.g., response cost), they often employ applied behavior analysis. Familiarize yourself with the steps in developing and implementing an intervention based on that technique.

Methods for Encouraging Behaviors

As you know, to encourage behavior is to reinforce it. There are several specific ways to encourage existing behaviors or teach new ones. These include teacher attention and praise, the Premack principle, shaping, and positive practice.

REINFORCING WITH TEACHER ATTENTION. Many psychologists advise teachers to "accentuate the positive"—praise students for good behavior while ignoring misbehavior. Some researchers believe that "adult attention is one of the most powerful and generally effective forms of reinforcement for children" (Cooper et al., 2020, p. 267). A related strategy is *differential reinforcement*, or ignoring inappropriate behaviors, while being sure to reinforce appropriate behaviors as soon as they occur. For example, if a student is prone to making irrelevant comments ("When is the game this Friday?"), you should ignore the off-task comment but recognize a task-related contribution as soon as it occurs.

This praise-and-ignore approach can be helpful, but don't expect it to solve all classroom management problems. Several studies have shown that disruptive behaviors persist when teachers use positive consequences (mostly praise) as their *only* classroom management strategy (McGoey & DuPaul, 2000; Sullivan & O'Leary, 1990). Also, if attention from other students is reinforcing the problem behaviors, the teacher's ignoring them won't help much.

There is a second consideration in using praise. Merely "handing out compliments" will not improve behavior. To be effective, praise must (a) be contingent on the behavior to be reinforced, (b) specify clearly the behavior being reinforced, and (c) be believable (Friend & Bursuck, 2019; O'Leary & O'Leary, 1977). In other words, the praise should be sincere recognition of a well-defined behavior so students understand what they did to warrant the recognition. In addition, some evidence indicates that praising students for being intelligent when they succeed can undermine their motivation if they do not perform as well the next time. When that happens, students who had been praised for being smart may be less persistent and enjoy the task less compared to students who had been praised earlier for working hard (Mueller & Dweck, 1998). Finally, some psychologists

have suggested that teachers' use of praise tends to focus students on learning to win the teacher's approval rather than on learning for its own sake. Perhaps the best advice is to be aware of the potential dangers of the overuse or misuse of praise and navigate accordingly. The *Guidelines: Applying Operant Conditioning—Using Praise Appropriately*, which are based on Brophy's (1981) extensive review of the subject, Alan Kazdin's (2008) work with parents and teachers, and Todd Finley (2017), give ideas for using praise effectively.

SELECTING REINFORCERS: THE PREMACK PRINCIPLE. In most classrooms, many reinforcers are readily available, such as the chance to talk to other students, work at computers, have free time, get homework or test exemptions, select your own seat, lead the line, be the teacher's assistant, or feed the class animals. However, teachers tend to offer these opportunities in a rather haphazard way. Just as with praise, by making privileges and rewards

GUIDELINES

Applying Operant Conditioning—Using Praise Appropriately

Be clear and systematic in giving praise.

Examples

1. Make sure praise is immediate and tied directly to appropriate behavior.
2. Make sure the student understands the specific action or accomplishment that is being praised. Say, "I am impressed that you made sure everyone in your group got a chance to speak," not "Good job leading the group."

Make praise sincere, not evaluative or controlling (Willingham, 2006).

Examples

1. Praise and appreciate the student's efforts, accomplishments, and actions—especially when the actions help others.
2. Don't evaluate the student's character or personality—praise the action, not the person.
3. Don't sneak in an attempt to control the student, for example, by saying, "Your journal entry was really easy to read. Why don't you write that well all the time?"
4. A related example, don't use "caboosing"—tacking a criticism on at the end, as in "Good job completing your homework this week. That's a first—what got into you?"

Set standards for praise based on individual abilities and limitations.

Examples

1. Praise progress or accomplishment in relation to the individual student's past efforts.
2. Focus the student's attention on his or her own progress, not on comparisons with others.

Attribute the student's success to effort and ability so the student will gain confidence that success is possible again.

Examples

1. Don't imply that the success may be based on luck, extra help, or easy material.
2. Ask students to describe the problems they encountered and how they solved them.

Make praise really reinforcing.

Examples

1. Don't attempt to influence the rest of the class by singling out some students for praise. This tactic frequently backfires because students know what's really going on. In addition, you risk embarrassing the student you have chosen to praise.
2. Don't give undeserved praise to students simply to balance failures. It is seldom consoling and calls attention to the student's inability to earn genuine recognition. Unearned praise can subtly communicate to a student that you think, "Poor child—you did your best, even though your best is pretty bad because you don't have the ability to do better." Instead communicate high, attainable expectations for everyone.

3. Make praise somewhat unpredictable so students don't become "addicted to praise." Remember the power of intermittent reinforcement.
4. Don't give praise that is really criticism in disguise, as in "Well, you finally wrote something worth reading!"

Recognize genuine accomplishments. Don't use unearned praise to "boost self-esteem."

Examples

1. Reward the attainment of specified goals, not just participation.
2. Do not reward uninvolved students just for being quiet and not disrupting the class.
3. Tie praise to students' improving competence or to the value of their accomplishment. Say, "I noticed that you double-checked all your problems. Your score reflects your careful work."

For more information on teacher praise, see https://www.aft.org/periodical/american-educator/winter-2005-2006/examples-constructive-praise-and-encouraging.

directly contingent on learning and positive behavior, the teacher can greatly increase both learning and desired behavior.

A helpful guide for choosing the most effective reinforcers is the **Premack principle**, named for David Premack (1965). According to the Premack principle, a preferred activity can be an effective reinforcer for a less preferred activity. This is sometimes referred to as "Grandma's rule": First, do what I want you to do, and then you may do what you want to do. Elizabeth used this principle in her class when she told them they could work together on their Civil War news program *after* they had quietly completed the first section of the worksheet on their own.

If students didn't have to study, what would they do? The answers to this question may suggest many possible reinforcers. For most students, talking, moving around the room, sitting near a friend, being exempt from assignments or tests, editing the class web page, using the computer, making a video, and playing games are preferred activities. The best way to determine appropriate reinforcers for your students may be to watch what they do in their free time. (For more ideas, see https://www.education.ne.gov/wp-content/uploads/2017/08/GoldMedal.pdf.)

For the Premack principle to be effective, the less preferred behavior must happen first. In the following dialogue, observe how the teacher loses a perfect opportunity to use the Premack principle:

Students: Oh, no! Do we have to work on grammar again today? The other classes got to discuss the play we saw in the auditorium this morning.
Teacher: But the other classes finished the lesson on sentences yesterday. We're almost finished too. If we don't finish the lesson, I'm afraid you'll forget the rules we reviewed yesterday.
Students: Why don't we finish the sentences at the end of the period and talk about the play now?
Teacher: OK, if you promise to complete the sentences later.

Discussing the play could have served as a reinforcer for completing the lesson. As it is, the class may well spend the entire period discussing the play. Just as the discussion becomes fascinating, the teacher will have to end it and insist that the class return to the grammar lesson.

SHAPING. What happens when students continually fail to gain reinforcement because they simply cannot perform a skill in the first place? Consider these examples:

- A fourth-grade student looks at the results of the latest mathematics test. "No credit on almost half of the problems again because I made one dumb mistake in each problem. I hate math!"

Premack principle

Principle stating that a more preferred activity can serve as a reinforcer for a less preferred activity.

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Encouraging/Discouraging Behaviors (I, B2)

Understand the appropriate uses of techniques to encourage or discourage various classroom behaviors. Know the limitations and problems associated with these types of interventions.

- A 10th-grade student finds some excuse each day for avoiding the softball game in gym class. The student cannot catch a ball and now refuses to try.

In both situations, the students are receiving no reinforcement for their work because the end product of their efforts is not good enough. A safe prediction is that the students will soon learn to dislike the class, the subject, and perhaps the teacher and school in general. One way to prevent this problem is the strategy of **shaping**, also called **successive approximations**. Shaping involves reinforcing progress instead of waiting for perfection.

Shaping/Successive approximations
Reinforcing small steps to reach a goal; the small component steps that make up a complex behavior.

To use shaping, the teacher must take the final complex behavior the student is expected to master and break it down into a number of small, manageable steps—bite-size pieces. One approach that identifies the small steps is **task analysis**, originally developed by R. B. Miller (1962) to help the armed services train personnel. Miller's system begins with a definition of the final performance requirement—what the trainee (or student) must be able to do at the end of the program or unit. Then the steps that will lead to the final goal are specified. The procedure simply works backward to break skills and processes down into subskills and subprocesses—small steps to success.

Task analysis
System for breaking down a task hierarchically into basic skills and subskills.

Consider an example of task analysis in which students must write a position paper based on research. If the teacher assigned the position paper without analyzing the task, what could happen? Some of the students might not know how to do systematic computer research. They might read one or two entries in Wikipedia and then write about their position based only on this brief reading. Another group of students might know how to use search engines to do research online and how to find information from indexes in books but have difficulty integrating information to reach conclusions. They might hand in lengthy papers listing summaries of different ideas without any synthesis or conclusions. Another group of students might be able to draw conclusions, but their written presentations might be so confusing and grammatically incorrect that the teacher could not understand what they were trying to say. Each of the groups would have failed to fulfill the assignment, but for different reasons.

A task analysis presents the logical sequence of steps leading toward the final goal. An awareness of this sequence can help teachers make sure that students have the necessary skills before they move to the next step. In addition, when students have difficulty, the teacher can pinpoint problem areas. Many behaviors can be improved through shaping, especially the acquisition of skills that involve persistence, endurance, increased accuracy, greater speed, or extensive practice to master. Because shaping is a time-consuming process, however, it should not be used if success can be attained through simpler methods such as cueing.

The *Guidelines: Applying Operant Conditioning—Encouraging Positive Behaviors* on the next page summarize different ways of encouraging positive behaviors.

Contingency Contracts, Token Reinforcement, and Group Consequences

You've just learned about ways to incorporate positive reinforcement into your classroom management system, the Premack principle and shaping. As other examples of effective classroom management, consider contingency contracts, token reinforcement, and group consequences.

Contingency contract
A contract between the teacher and a student specifying what the student must do to earn a particular reward or privilege.

CONTINGENCY CONTRACTS. In a **contingency contract** program, the teacher draws up an individual contract with each student, describing exactly what the student must do to earn a particular privilege or reward. In some programs, students suggest behaviors to be reinforced and the rewards that can be gained. The negotiating process itself can be an educational experience, as students learn to set reasonable goals and abide by the terms of a contract. And, if students participate in setting the goals, they often are more committed to reaching them (Locke & Latham, 2002; Schunk, 2020; Schunk et al., 2014).

An example of a contract for completing assignments that is appropriate for intermediate and upper-grade students is presented in Figure 7.2. This contract should state clear goals, criteria to determine if the goals are met adequately and completely, and consequences

GUIDELINES

Applying Operant Conditioning—Encouraging Positive Behaviors

Make sure you quickly recognize positive behavior in ways that students value.

Examples

1. When presenting class rules, set up positive consequences for following rules as well as negative consequences for breaking rules.
2. Recognize honest admissions of mistakes by giving a second chance: "Because you admitted that you copied your paper from a book, I'm giving you a chance to rewrite it."
3. Offer desired rewards for academic efforts, such as extra recess time, exemptions from homework or tests, or extra credit on major projects.

When students are tackling new material or trying new skills, give plenty of reinforcement.

Examples

1. Find and comment on something (genuinely) good in every student's first life drawing.
2. Reinforce students for encouraging each other. "French pronunciation is difficult and awkward at first. Let's help each other by eliminating all giggles when someone is brave enough to attempt a new word."

After new behaviors are established, give reinforcement on an unpredictable schedule to encourage persistence.

Examples

1. Offer surprise rewards for good participation in class.
2. Start classes with a short, written extra-credit question. Students don't have to answer, but a good answer will add points to their total for the semester.
3. Make sure the good students get compliments for their work from time to time. Don't take them for granted.

Use the Premack principle to identify effective reinforcers.

Examples

1. Watch what students do with their free time.
2. Notice which students like to work together. The chance to work with friends is often a good reinforcer.

Use cueing to help establish new behaviors.

Examples

1. Put up humorous signs in the classroom to remind students of rules.
2. At the beginning of the year, as students enter class, call their attention to a chart posted on the board listing all of the materials they should have with them when they come to class.

Make sure all students, even those who often cause problems, receive some praise, privileges, or other rewards when they do something well.

Examples

1. Review your class list occasionally to make sure all students are receiving some reinforcement.
2. Set standards for reinforcement so that all students will have a chance to be rewarded.
3. Check your biases. Are boys getting more opportunities for reinforcement than girls, or vice versa? How about students of different races?

Establish a variety of reinforcers.

Examples

1. Let students suggest their own reinforcers or choose from a "menu" of reinforcers with "weekly specials."
2. Talk to other teachers or parents about ideas for reinforcers.

Figure 7.2 A Basic Contingency Contract

An example contract for older students. This can be adapted to fit the situation and needs of the student.

Contract

I, _____, declare on this date _____ that I agree to do the following:

Goals: _____

1.
2.
3.

These goals will be considered complete if and when _____

_____

Rewards If Goals Are Met: _____

1.
2.
3.

Consequences If Goals Are Not Met: _____

1.
2.
3.

This contract will be reviewed by the student and teacher on the following date:

_____.

By signing this contract, all parties agree to the stipulations in the document and will follow accordingly.

_____

(Signature of Student Date)

_____

(Signature of Teacher Date)

for success or failure in reaching the goals. An important part of the agreement is a specified time to review the contract to be sure the terms are clear and helpful and perhaps to make adjustments. Information about progress can support student motivation.

TOKEN REINFORCEMENT SYSTEMS.

Stop & Think Have you ever participated in a program where you earned points or credits that you could exchange for a reward? Are you a member of a frequent flyer club, or do you get points on your credit card? Do you get one free coffee for every 10 coffee purchases or a free smoothie when you fill a punch card? Does being a part of such a program affect your buying habits? How? I know I pay for everything I can with one credit card to get the points and always try to fly on one airline for the same reason. I am participating in a token reinforcement system.

Token reinforcement system
System in which tokens earned for academic work and positive classroom behavior can be exchanged for some desired reward.

Often, it is difficult to provide positive consequences quickly for all the students who deserve them. A **token reinforcement system** can help solve this problem by allowing all students to earn tokens for both academic work and positive classroom behavior. The tokens may be points, checks, holes punched in a card, chips, play money, or anything else that is easily identified as the student's property. Periodically, the students exchange the tokens they have earned for some desired reward (Alberto & Troutman, 2017; Kazdin, 2001).

Depending on the age of the student, the rewards could be small toys, school supplies, free time, special class jobs, positive notes sent home, time to listen to music or play computer

games, a chance to sit with friends, or other privileges. When a "token economy," as this kind of system is called, is first established, the tokens should be given out on a fairly continuous schedule, with chances to exchange the tokens for rewards available early and often. Once the system is working well, however, tokens should be distributed on an intermittent schedule and saved for longer periods of time before they are exchanged for rewards.

Another variation is to allow students to earn tokens in the classroom and then exchange them for rewards at home. These plans are very successful when parents are willing to cooperate. Usually a note or report form is sent home daily or twice a week. The note indicates the number of points earned in the preceding time period. The points may be exchanged for minutes of screen time or video game time, access to special toys, or private time with parents. Points can also be saved up for larger rewards such as trips. Do not use this procedure, however, if you suspect the child might be pressured for perfection or punished for poor reports (Jurbergs et al., 2007).

Token reinforcement systems are complicated and time-consuming. Generally, they should be used in only three situations: (a) to motivate students who are completely uninterested in their work and have not responded to other approaches, (b) to encourage students who have consistently failed to make academic progress, and (c) to deal with a class that is out of control. Some groups of students seem to benefit from token economies more than others. Students with intellectual disabilities, children who have failed often, students with few academic skills, and students with behavior problems all seem to respond to the concrete, direct nature of token reinforcement.

The few pages devoted here to token reinforcement and contingency contracts can offer only an introduction to these programs. If you want to set up a large-scale reward program in your classroom, you should probably seek professional advice. Often, the school psychologist, counselor, or principal can help.

GROUP CONSEQUENCES. A teacher can base reinforcement for the class on the behavior of selected target students (e.g., "If Jamarcus, Evan, and Mei stay on their mats until the end of nap time, then we will have a special snack"). Also, the class can earn rewards based on the collective behavior of everyone in the class, usually by adding each student's points to a class or a team total.

Put Yourself in His Place Imagine you are a very bright third-grade student in a small Texas town. You are an amazing mimic and love to tell jokes. Because you are pretty bored at times with the pace of class, you would rather have fun than focus on the lessons, so you can cause trouble. What does our clever teacher do? She tells you and the class that if everyone works hard all week, then you can do your stand-up comedy routine for the class every Friday afternoon. What was a problem becomes a solution and Jamie Foxx begins his career as a master entertainer. (To hear Jamie Foxx tell the story, listen to this podcast: http://fourhourworkweek.com/2015/12/06/jamie-foxx.)

The teacher in the *Put Yourself in His Place* feature is using a combination of individual (for Jamie) and group (for the class) consequences—and expanding the learning time for everyone in the process.

The **good behavior game** is a more structured example of group consequences. Teachers and students discuss what would make the classroom a better place and identify behaviors that get in the way of learning. Based on this discussion, class rules are developed, and the class is divided into two or three teams. Each time a student breaks one of the rules, that student's team is given a mark. The team with the fewest marks at the end of the period receives a special reward or privilege (longer recess, first to lunch, the team "spaceship" is moved closer to the "moon," and so on). If all teams earn fewer than a preestablished number of marks, all receive the reward. Sometimes a class needs a "no tattling" rule so the teams don't spend all their time pointing out each other's mistakes. Most studies indicate that even though the game generates only small improvements in academic achievement, it can produce definite improvements in the behaviors listed in the good behavior rules, and it can prevent many behavior problems, especially in classes with frequent issues. One

Good behavior game
Arrangement where a class is divided into teams and each team receives demerit points for breaking agreed-upon rules of good behavior.

important aspect of the program is to be sure the rewards available are attractive and valued. If you use the good behavior game, you might survey your students first to identify their preferences for rewards (Flower et al., 2014; Tingstrom et al., 2006).

What happens if we add interventions that target academic achievement to the proven power of the good behavior game? Catherine Bradshaw and her colleagues did just that (Bradshaw et al., 2009). They followed 678 mostly Black students from urban first-grade classes through their high school years. In first grade, these students participated in either a control group or one of two specific programs: (a) a classroom-centered intervention that combined the good behavior game with an enhanced academic curriculum (read-alouds, journal writing, Reader's Theater, critical thinking skills, Mimosa math, small-group activities, etc.) or (b) a family-centered intervention that promoted parent involvement in home reading and math activities and helped parents develop better child management strategies. Students who participated in the classroom intervention that combined the good behavior game with an enhanced academic curriculum in first grade had higher scores on standardized achievement tests in grade 12, reduced referrals for special education services, higher rates of high school graduation, and higher rates of college attendance *12 years later*! The parent involvement program had a small, significant effect only on reading test scores. So early investment in helping students learn positive behaviors *and* academic skills can make a difference for years to come.

Group consequences

Rewards or punishments given to a class as a whole for adhering to or violating rules of conduct.

You can also use **group consequences** without dividing the class into teams; that is, you can base reinforcement on the behavior of the whole class. However, caution is needed using group approaches—the whole group should not suffer for the misbehavior or mistakes of one individual if the group has no real influence over that person. I once saw an entire class break into cheers when the teacher announced that one boy was transferring to another school. The chant "No more points! No more points!" filled the room. The "points" referred to the teacher's system of giving one point to the whole class each time anyone broke a rule. Every point meant 5 minutes of recess lost. The boy who was transferring had been responsible for the loss of many recess periods. He was not very popular to begin with, and the point system, though quite effective in maintaining order, had made the boy an outcast in his own class.

Peer pressure in the form of support and encouragement, however, can be a positive influence. Group consequences are recommended when students care about the approval of their peers (Theodore et al., 2001). If the misbehavior of several students seems to be encouraged by the attention and laughter of other students, then group consequences could be helpful. Teachers might show students how to give support and constructive feedback to classmates. If a few students seem to enjoy sabotaging the system, those students may need separate arrangements such as putting all the saboteurs together in their own group.

Handling Undesirable Behavior

Before we explore ways to handle problem behaviors, let's take a minute to consider why students disrupt class or break rules. We saw one reason in the story about Jamie Foxx—he was just bored and also was a great entertainer. How much more rewarding it must have been for a third-grader to enjoy the laughter of his friends than to focus on a lesson he already understood. Other possibilities—perhaps a student has an unidentified learning disability or lacks the social skills to make friends and disrupts class as a way to vent frustration or get attention. Maybe the student feels no connection with the lessons because her race or ethnicity is seldom represented in the materials or the teacher seems to have low expectations for her. What is behind the misbehavior? Are your teaching methods and materials right for the students? Sometimes, class disruption or lack of motivation indicates that teaching practices need to be changed. Maybe the class rules are unclear or are enforced inconsistently. Perhaps your instructions are vague. Maybe the text is too easy or too hard or the pace is wrong. If these problems exist, rewards or punishments may improve the situation temporarily, but the students will still have trouble learning the academic material. *Improve your teaching first*. Focus on the positive, develop caring and respectful relationships with your students, keep the pace and difficulty level right, and design engaging, culturally appropriate lessons and assignments.

Assume you have addressed all these issues pretty well, but some problems persist—now what? There are times when you must cope with undesirable behavior, either because

other methods fail or because the behavior itself is dangerous and calls for direct action. For this purpose, negative reinforcement, positive practice overcorrection, reprimands, response cost, and social isolation all offer possible solutions.

NEGATIVE REINFORCEMENT. Recall the basic principle of negative reinforcement: If an action stops or avoids something unpleasant, then that action is likely to occur again in similar situations. Negative reinforcement was operating in Elizabeth's classroom. When they moaned and complained, her students escaped the test, so negative reinforcement probably increased the frequency of complaining in the future.

Negative reinforcement can also be used to enhance learning. To do this, you place students in mildly unpleasant situations so they can "escape" when their behavior improves. Consider these examples:

> *Teacher to a third-grade class:* "When the supplies are put back in the cabinet and each of you is sitting quietly, we will go outside. Until then, we will miss our recess."
> *High school teacher to a student who seldom finishes in-class assignments:* "As soon as you complete the assignment, you may join the class in the auditorium. But until you finish, you must work in the study hall."
> *Antonio Banderas in the film Take the Lead:* Working with a group of totally uncooperative high school students, Banderas blasts the students with "oldies" music they hate, only turning it off when the entire class is lined up and ready to practice their ballroom dance moves.

You may wonder why these negative reinforcement examples are not considered punishment. Surely, staying in during recess, not accompanying the class to a special program, or being subjected to music you hate is punishing. But the focus in each case is on *strengthening* specific behaviors (putting away supplies, finishing in-class assignments, lining up and cooperating with the teacher). The teacher strengthens (reinforces) the behaviors by removing something aversive *as soon as the desired behaviors occur*. Because the consequence involves removing or "subtracting" a stimulus, the reinforcement is negative.

Negative reinforcement also gives students a chance to exercise control. Missing recess and hearing music you hate are unpleasant situations, but in each case, the students retain control. As soon as they perform the appropriate behavior, the unpleasant situation ends. In contrast, punishment occurs after the fact, and a student cannot so easily control or terminate it.

There are several rules for negative reinforcement: Describe the desired change in a positive way. Don't bluff. Make sure you can enforce your unpleasant situation. Follow through despite complaints. Insist on action, not promises. If the unpleasant situation terminates when students *promise* to be better next time, you have reinforced making promises, not making changes (Alberto & Troutman, 2017; O'Leary, 1995).

POSITIVE PRACTICE OVERCORRECTION. Remember, there is one element that is part of every behavioral learning program—specific practice of correct behaviors. Contrary to popular wisdom, practice does not make perfect. Instead, practice makes *permanent* the behaviors practiced, so practicing accurate behaviors is important. In **positive practice overcorrection**, students replace a negative behavior with a positive one. This approach is especially appropriate for dealing with academic errors. When students make a mistake, they must correct it as soon as possible and practice the correct response. The same principle can be applied when students break classroom rules. Instead of being punished, the student might be required to practice the correct alternative action—for example, entering the room and immediately putting backpacks in assigned places. This process is called *positive practice overcorrection* because the correct behavior is practiced until it is overlearned and becomes almost automatic (Copoer et al., 2020; Marvin et al., 2010).

Positive practice overcorrection
Practicing correct responses immediately after errors.

REPRIMANDS. In the *Junction Journal*, my daughter's elementary school newspaper, I read the following lines in a story called "Why I Like School," written by a fourth-grader: "I also like my teacher. She helps me understand and learn. She is nice to everyone. I like it when she gets mad at somebody, but she doesn't yell at them in front of the class, but speaks to them privately."

Soft, calm, private **reprimands** are more effective than loud, public reprimands in decreasing disruptive behavior (Landrum & Kauffman, 2006). Research has shown that when

Reprimands
Criticisms for misbehavior; rebukes.

reprimands are loud enough for the entire class to hear, disruptions increase or continue at a constant level. Some students enjoy public recognition for misbehavior, or they don't want classmates to see them "lose" to the teacher. If they are not used too often and if the classroom is generally a positive, warm environment, then students usually respond quickly to private reprimands (Kaplan, 1991).

Response cost
Punishment by loss of reinforcers.

RESPONSE COST. The concept of **response cost** is familiar to anyone who has ever paid a fine. For certain infractions of the rules, people must lose some reinforcer—money, time, privileges (Walker et al., 2004). In a class, the concept of response cost can be applied in a number of ways. The first time a student breaks a class rule, the teacher gives a warning. The second time, the teacher makes a mark beside the student's name in the grade book. The student loses 2 minutes of recess for each mark accumulated. For older students, a certain number of marks might mean losing the privilege of working in a group or using the computer.

Social isolation
Removal of a disruptive student for 5 to 10 minutes.

Time out
Technically, the removal of all reinforcement. In practice, isolation of a student from the rest of the class for a brief time.

SOCIAL ISOLATION. One of the most controversial behavioral methods for decreasing undesirable behavior is the strategy of **social isolation**, often called **time out** from reinforcement. Time out from reinforcement is one of the most common disciplinary procedures around the world (Dadds & Tully, 2019). The process involves removing a highly disruptive student from the classroom for 5 to 10 minutes. The student is placed in an empty, uninteresting space alone—the punishment is brief isolation from other people. A trip to the principal's office or confinement to a chair in the corner of the general classroom does not have the same effect as sitting alone in an empty place. But beware. If a brief time out does not help improve the situation, don't try a longer time out. Alan Kazdin (2008), who has been helping teachers and parents work positively with children for decades, says, "If you are giving longer and longer time-outs, it means your strategy is failing. The answer is not to escalate—just the opposite in fact. If you are giving more and longer time-outs, this should tell you that you need to do more to positively reinforce good behaviors to replace the unwanted behaviors" (p. 10)—good advice for any form of punishment.

So how can you use time out effectively and compassionately? Mark Dadds and Lucy Tully (2019) provide these guidelines for parents—they make sense for teachers too:

1. Make sure the student understands the behaviors expected and why they matter.
2. Use time out only for inappropriate behaviors that the student can control, not for mistakes or overwhelming distress reactions. It is how the student responds to the mistake or distress that counts as controllable.
3. As Kazdin warned, if you are using time out more and more or longer and longer—it isn't working. Try something else.
4. Stay calm and positive yourself as you enforce the time out.
5. Use time out as part of a larger positive response that promotes a warm teacher–student relationship and affirms the value of the student.
6. Don't set an arbitrary time out period. Let the student control when the time out ends by showing a brief, stable return to appropriate behavior (sounds like a good use of negative reinforcement).
7. At another time, help the student learn more positive ways to self-regulate (see Cluster 11).
8. Apply time out equally and fairly across students and situations.

One final but important guideline: If any of your students have experienced trauma, never use time out in response to their symptoms of trauma. Punishing trauma symptoms could actually make the trauma worse. Focus on more positive approaches and support, as we discussed in Clusters 4, 5, and 6. For a teaching mentor's perspective on time out, see https://www.responsiveclassroom.org/time-out-early-often-everyone.

SOME CAUTIONS ABOUT PUNISHMENT. Remember the "no more points" chant I described under group consequences? The teacher actually was using a punishment-based system—*removal punishment* to be exact. For every rule-breaking point, the class had 5 minutes

of recess removed. The system led to rejection of the main rule breaker. So punishment can have social-emotional and motivational consequences. For example, in five different studies with adults, feedback on tests that an answer was wrong led to less learning than feedback when an answer was right. This result is impressive because there were only two answer choices, so if you were told your answer was wrong, it was clear the other answer was right; both failure feedback and success feedback made the right answer clear. Maybe being told you are wrong causes you to just tune out (Eskreis-Winkler & Fishaback, 2019). If you must give constructive criticisms, then connect the criticism to clear criteria or standards that the student knew in advance, include feedback about how to improve, and give the feedback privately, in person (Fong et al., 2019).

Unfortunately, punishment seems to be a very common part of parenting and schooling. I say *unfortunately* because study after study shows that punishment by itself, as usually practiced in homes and schools, just doesn't work. It tells children what to stop doing (often, they knew that already), but it does not teach them what to do instead (Kazdin, 2008). Physical punishment is particularly ineffective and harmful (Gershoff et al., 2019). Whenever you consider the use of punishment, you should make it part of a two-pronged attack. First, carry out the punishment and suppress the undesirable behavior. Second, make it clear what the student should be doing instead and to provide reinforcement for those desirable actions. Thus, while the problem behaviors are being suppressed, positive alternative responses are being strengthened. As you will see in the next section, recent approaches really emphasize supporting positive behaviors. The *Guidelines: Applying Operant Conditioning—Using Punishment* give ideas for using punishment for positive purposes.

Connect and Extend to PRAXIS II®

Teaching and Management (I, A1; II, A3; I, C4)

Identify major approaches to teaching and classroom management that are based on behavioral principles. Understand the advantages and disadvantages of each.

GUIDELINES

Applying Operant Conditioning—Using Punishment

Try to structure the situation so you can use negative reinforcement rather than punishment.

Examples

1. Allow students to escape unpleasant situations (completing additional workbook assignments, weekly tests of math facts) when they reach a level of competence.
2. Insist on actions, not promises. Don't let students convince you to change the terms of the agreement.

If you do use punishment, keep it mild and brief—then pair it with doing the right thing.

Examples

1. Time out for young children—no more than 2 to 5 minutes and ended when the students return to appropriate behavior; loss of points—no more than one sticker if the student can earn five in a day (Kazdin, 2008).
2. Pair the brief, mild punishment with reinforcement for doing the right thing or restitution. If a student writes graffiti in the restroom, use brief punishment plus cleaning off the graffiti.

Be consistent in your application of punishment.

Examples

1. Avoid inadvertently reinforcing the behavior you are trying to punish. Keep confrontations private so that students don't become heroes for standing up to the teacher in a public showdown.
2. Let students know in advance the consequences of breaking the rules by posting major class rules for younger students or outlining rules and consequences in a course syllabus for older students.
3. Tell students they will receive only one warning before punishment is given. Give the warning in a calm way, and then follow through.
4. Make punishment as unavoidable and immediate as is reasonably possible.

(Continued)

5. Don't punish when you are angry—you may be too harsh and then need to take it back later, which shows a lack of consistency.

Focus on the students' actions, not on the students' personal qualities.

Examples

1. Reprimand in a calm but firm voice.
2. Avoid vindictive or sarcastic words or tones of voice. You might hear your own angry words later when students imitate your sarcasm.
3. Stress the need to end the problem behavior instead of expressing any dislike you might feel for the student.
4. Be aware that students of color are disproportionately punished, sent to detention, and expelled from school. Are your policies and enforcements fair?

Adapt the punishment to the infraction.

Examples

1. Ignore minor misbehaviors that do not disrupt the class, or stop these misbehaviors with a disapproving glance or a move toward the student.
2. Make sure the punishment isn't worse than the crime—don't take away all the free time a student has earned for one infraction of the rules, for example (Landrum & Kauffman, 2006). Less punishment is more effective, as long as it is paired with reinforcement for doing the right thing.
3. Don't use extra homework as a punishment for misbehaviors such as talking in class.
4. When a student misbehaves to gain peer acceptance, removal from the group of friends can be effective, because this is really time out from a reinforcing situation.
5. If the problem behaviors continue, analyze the situation and try a new approach. Your punishment may not be very punishing, or you may be inadvertently reinforcing the misbehavior.

For more information on punishment and alternatives, see https://www.edutopia.org/article/aiming-discipline-instead-punishment.

We repeat: Punishment in and of itself does not lead to any positive behavior. Harsh punishment communicates to students that "might makes right" and may encourage retaliation. In addition, punishment works best when the potential punisher—the teacher—is around. Students learn to "be good" when the teacher is in the room, but when the teacher leaves or there is a substitute teacher, the system might fall apart. Punishment tends to focus students on the consequences of their actions for themselves instead of challenging them to think about the impacts of their behaviors on others; as a result, punishment does not instill compassion or empathy for others. Finally, punishment can interfere with developing a caring relationship with your students (Alberto & Troutman, 2017; Hardin, 2008; Kohn, 2005).

Module 23 Summary

Putting It All Together: Applied Behavior Analysis (pp. 302–314)

What are the steps in applied behavior analysis? (a) Clearly specify the behavior to be changed and your goal. (b) Observe the current level of the behavior and possible causes. (c) Plan a specific intervention using antecedents, consequences, or both. (d) Keep track of the results, and modify the plan if necessary.

How can teachers use praise and reinforcers well? Teacher attention is a powerful reinforcer. Praise, if used appropriately, can support positive behaviors, but praise-and-ignore strategies all by themselves usually are not enough to change students' behaviors. The Premack principle states that a high-frequency behavior (a preferred activity) can be an effective reinforcer for a low-frequency behavior (a less preferred activity). The best way to determine appropriate reinforcers for your students may be to watch what they do in their free time. For most students,

talking, moving around the room, sitting near a friend, being exempt from assignments or tests, having computer time, and playing games are preferred activities.

When is shaping an appropriate approach? Shaping helps students develop new responses a little at a time, so it is useful for building complex skills, working toward difficult goals, and increasing persistence, endurance, accuracy, or speed. Because shaping is a time-consuming process, however, it should not be used if success can be attained through simpler methods such as cueing.

What are the managerial strategies for group consequences, contingency contracts, and token programs? Using group consequences involves basing reinforcement for the whole class on the behavior of the whole class. In a contingency contract program, the teacher draws up an individual contract with each student, describing exactly what the student must do to earn a particular privilege or reward. In token programs, students earn tokens (points, checks, holes punched in a card, chips, etc.) for both academic work and positive classroom behavior. Periodically, the students exchange the tokens they have earned for some desired reward. A teacher must use these programs with caution, emphasizing learning and not just "good" behavior.

What are some cautions in using punishment? Punishment in and of itself does not lead to any positive behavior or compassion for others, and it may interfere with developing caring relationships with students. Thus, whenever you consider the use of punishment, you should make it part of a two-pronged attack. First, carry out the punishment, and suppress the undesirable behavior. Second, make clear what the student should be doing instead, and provide reinforcement for those desirable actions. Thus, while the problem behaviors are being suppressed, positive alternative responses are being strengthened.

MODULE 24 Current Applications of Behavioral Theories

Learning Objective 7.5 Apply functional behavioral assessment, positive behavioral supports, and self-management techniques.

Learning Objective 7.6 Evaluate contemporary challenges to behavioral theories of learning and address concerns about their application.

Current Applications: Functional Behavioral Assessment, Positive Behavior Supports, and Self-Management

Earlier in this cluster when we discussed coping with problem behaviors, I cautioned you to first ask "why"—why is the student getting "sick" or acting out? Teachers in both general and special education classes have had success with an approach that begins by asking a similar question, "What are students getting out of their inappropriate behaviors—what functions do these behaviors serve?" The focus is on the *why* of the behavior, not on the *what* (Kittelman et al., 2020; Pas et al., 2019). The reasons for problem behaviors generally fall into six categories:

1. Gain attention from others—teachers, parents, or peers.
2. Gain a desired item or activity.
3. Gain sensory stimulation, such as from rocking or flag arms for some children with autism.
4. Escape attention from adults or peers.
5. Escape from a demanding or boring task, event, or situation.
6. Escape from sensory stimulation that is painful or disturbing.

If the reason for the behavior is known, then the teacher can devise ways of supporting positive behaviors that will serve the same "why" function. For example, I once worked with a middle school principal who was concerned about a boy who had lost his father a few years earlier and was having trouble in a number of subjects, especially math. The student disrupted math class at least twice a week and ended up in the principal's office. There, the boy enjoyed the principal's undivided attention. After a scolding, they talked about sports because the principal liked the student and was concerned that he had no male role models. It is easy to spot the function of the classroom disruptions—they always led to (a) *escaping* from math class (negative reinforcement) and (b) *gaining* one-on-one time with the principal (positive reinforcement after a little bit of reprimanding). The principal, teacher, and I developed a way to support the student's positive behaviors in math by getting him some extra tutoring and by giving him time with the principal when he completed math problems instead of when he acted up in class. The new positive behaviors served many of the same functions as the old problem behaviors.

Discovering the "Why": Functional Behavioral Assessments

Functional behavioral assessment (FBA)

Procedures used to obtain information about antecedents, behaviors, and consequences to determine the reason or function of the behavior.

The process of understanding the "why" of a problem behavior is known as **functional behavioral assessment (FBA)**. Using a wide range of procedures to map the A–B–Cs of the situation (antecedents–behaviors–consequences), teachers try to identify the reason for the behavior.

Many different procedures might help you determine the functions of a specific behavior in your classes. You can begin by interviewing students about their behaviors. In one study, students were asked to describe what they did that got them in trouble in school, what happened just before they acted out, and what happened right after. Even though the students were not always sure why they acted out, they seemed to benefit from talking to a concerned adult who was trying to understand their situation, not just reprimand them (S. G. Murdock et al., 2005). But you will need to do more than just talk to students. You might also talk to parents or other teachers. You could conduct an A–B–C observation with these questions in mind: When and where does the problem behavior occur? What people or activities are involved? What happens right before—what do others do or say, and what did the target student do or say? What happens right after the behavior—what did you, other students, or the target student do or say? What does the target student gain or escape from by engaging in the behavior—what changes after the student acts out? A more structured approach is shown in Figure 7.3, an observation guide for FBA based on a simple A–B–C analysis. Using this information, the teacher found out that the student acted out

Figure 7.3 A Simple Structured Observation Guide for Functional Behavioral Assessment Using the A–B–C Frame

Student Name: Denton R. Date: 2/25/2018
Location: Algebra II—Ms. B Observer: Mr. D.
Start time: 1:02 Stop time: 1:15

A: Antecedents	B: Behaviors	C: Consequences
1:03 Students get out books and open to begin class.	D. pulls out his cap and puts it on.	Students around D. start laughing and saying "Hey."
1:05 Teacher notices D. and tells him to remove his cap.	D. stands, slowly removes his cap, and bows.	Students applaud.
1:14 Teacher asks D. a question.	D. says, "Man, I don't know."	Another student says, "Yeah, you're stupid." Others laugh.

Source: Based on Friend, M. & Bursuck, W. D. (2019). *Including students with special needs: A practical guide for classroom teachers* (8th ed.), p. 407. Adapted by permission of Pearson Education, Inc.

whenever the class was transitioning to another activity. The sources of reinforcement for the student are clear too.

The same behaviors may serve different functions for different students. For example, an FBA of three preschool students found that two of the students were aggressive and uncooperative in order to gain the teacher's attention, but the third child actually was trying to escape or avoid teacher attention (Dufrene et al., 2007). With information from an FBA, teachers developed an intervention package, including *positive behavior supports (PBS)* for each child. Two students met specific standards to get the teacher attention they wanted, but the third child got to be "left alone" as long as he met certain standards.

Reaching Every Student: Positive Behavior Supports

The Individuals with Disabilities Education Act (IDEA, 2017) discussed in Cluster 5 requires positive behavior supports for students with disabilities and those at risk for special education placement. **Positive behavior supports (PBS)** are the actual interventions designed to replace problem behaviors with new actions that serve the same purpose for the student.

Positive behavior supports (PBS)
Interventions designed to replace problem behaviors with new actions that serve the same purpose for the student.

Positive behavior supports can help individual students with disabilities succeed in inclusion classrooms. For example, the disruptive behavior of a 5-year-old boy with an intellectual disability was nearly eliminated in a relatively short time through a PBS intervention that was based on an FBA conducted by the general education teaching staff and the special education teacher. The intervention included making sure the tasks assigned were at the right difficulty level, providing assistance with these tasks, teaching the student how to request assistance, and teaching the student how to request a break from assigned work (Soodak & McCarthy, 2006; Umbreit, 1995).

At the classroom level, teachers are encouraged to use such preventive strategies as **precorrection**, which involves identifying the context for a student's misbehavior, clearly specifying the alternative expected behavior, modifying the situation to make the problem behavior less likely (e.g., providing a cue or moving the student away from tempting distractions), and then rehearsing the expected positive behaviors in the new context and providing powerful reinforcers when the positive behaviors occur. Using PBS, teachers attempt to keep students engaged, provide a positive focus, consistently enforce school/class rules, correct disruptive behavior proactively, and plan for smooth transitions (Freiberg, 2006).

Precorrection
A tool for positive behavior support that involves identifying the context for a student's misbehavior, clearly specifying the alternative expected behavior, modifying the situation to make the problem behavior less likely, and then rehearsing the expected positive behaviors in the new context and providing powerful reinforcers.

But PBS approaches are not only for individual students or classrooms. In fact, schoolwide positive behavioral interventions and supports (SWPBIS) is one of the most widely adopted evidence-based frameworks, with over 25,000 participating schools in the United States (Kittelman et al., 2019). This framework fits well into the three tiers of intervention described in Cluster 5 (Friend & Bursuck, 2019; Pas et al., 2019).

Tier 1 (primary prevention) targets about 80% to 85% of the students in the school. Teachers and administrators:

- Agree on a common approach for supporting positive behaviors and correcting problems.
- Develop a few positively stated, specific behavioral expectations and procedures for teaching these expectations to all students.
- Identify a continuum of ways (from small and simple, to more complex and stronger) to acknowledge appropriate behaviors and correct behavioral errors.
- Integrate the positive behavior support procedures with the school's discipline policy.
- Consider adding character-building programs and social skills instruction for all students.

Tier 2 (secondary prevention) uses small-group interventions to support the behaviors of an additional 10% to 15% of the students who need more intensive help. Examples include:

- Small-group counseling and mentoring
- Structured rewards for appropriate behavior.
- Small-group social skills training

Tier 3 (tertiary prevention) for 1% to 5% of students:

- Individual functional behavior assessments (FBA)
- Individual and family counseling
- Individual interventions and applied behavior analysis plans

Research shows that disciplinary referrals decrease when the whole school uses PBIS approaches for all students, but the improvements are especially evident for students at the greatest risk for behavior problems (Bradshaw et al., 2015). Because about 5% of students account for about 50% of the discipline referrals, it makes sense to develop interventions for those students. For example, a study comparing middle school students in a behavior support program with students outside the program showed that disciplinary referrals as well as verbal and physical aggression significantly decreased. In addition, students' perceptions of school safety improved (Metzler et al., 2001).

Even with newer approaches such as PBS, in recent years, most behavioral psychologists have found that operant conditioning offers too limited an explanation of learning. As behavioral approaches to learning developed, some researchers added a new element—self-management.

Self-Management

Stop & Think What area of your life needs some self-management? Write down one behavior you would like to increase and one behavior you would like to eliminate.

As you will see throughout this book, the role of students in managing their own learning is a major concern of psychologists and educators today. This concern is not restricted to any one group or theory. Different perspectives all converge on one important idea: that the responsibility and the ability to learn rest within the student. Students must be active—no one can learn *for* someone else (Butler et al., 2017; Friend & Bursuck, 2019). From a behavioral perspective, students may be involved in any or all of the steps in a basic behavior change program. They may help set goals, observe their own work, keep records of it, and evaluate their own performance. Finally, they can select and deliver reinforcement.

Self-management
Management of your own behavior and acceptance of responsibility for your own actions. Also, the use of behavioral learning principles to change your own behavior.

GOAL SETTING. It appears that the goal-setting phase is very important in **self-management** (Reeve, 1996; Schunk et al., 2014). Some research suggests that setting specific goals and making them public may be the critical elements of self-management programs. For example, years ago S. C. Hayes and his colleagues identified college students who had serious problems with studying and taught them how to set specific study goals. Students who set goals and announced them to the experimenters performed significantly better on tests covering the material they were studying than students who set goals privately and never revealed them to anyone (Hayes et al., 1985).

Higher standards tend to lead to higher performance (Locke & Latham, 2002). But what types of goals are important? If you read about the skills needed for 21st-century learning, you see goals such as *self-direction*, *problem solving*, *critical thinking*, *creativity*, *collaboration*, *communication*, and *social responsibility*. Perhaps you can work with your students to set specific goals that will help to develop these 21st-century skills (Butler et al., 2017).

MONITORING AND EVALUATING PROGRESS. Students may also participate in the monitoring and evaluation phases of a behavior change program. These are the elements of self-management that most often are handled by the students themselves (Briesch & Chafouleas, 2009). Some

examples of behaviors that are appropriate for self-monitoring are the number of assignments completed, time spent practicing a skill, number of books read, number of problems correct, and time taken to run a mile. Tasks that must be accomplished without teacher supervision, such as homework or private study, are also good candidates for self-monitoring. Students keep a chart, diary, or checklist that records the frequency or duration of the behaviors in question. A progress record card can help older students break down assignments into small steps, determine the best sequence for completing the steps, and keep track of daily progress by setting goals for each day. The record card itself serves as a cue that can be faded out.

Self-evaluation is somewhat more difficult than simple self-recording because it involves making a judgment about quality. Students can evaluate their behavior with reasonable accuracy, especially if they work with their teacher to co-construct criteria for judging a good performance or product (Butler et al., 2017). One key to accurate self-evaluation seems to be for the teacher to periodically check students' assessments and give reinforcement for accurate judgments. Older students may learn accurate self-evaluation more readily than younger students. Self-correction can accompany self-evaluation. Students first evaluate and then alter and improve their work and, finally, compare the improvements to the standards again (Mace et al., 2001).

SELF-REINFORCEMENT. The last step in self-management is **self-reinforcement**. There is some disagreement, however, as to whether this step is actually necessary. Some psychologists believe that setting goals and monitoring progress alone are sufficient and that self-reinforcement adds nothing to the effects. Others believe that rewarding yourself for a job well done can lead to higher levels of performance than simply setting goals and keeping track of progress (Bandura, 1986). If you are willing to be tough and really deny yourself something you want until your goals are reached, then perhaps the promise of the reward can provide extra incentive for work. With that in mind, you may want to think of some way to reinforce yourself when you finish reading this cluster. A similar approach helped me write the cluster in the first place.

Self-reinforcement
Controlling (selecting and administering) your own reinforcers.

At times, families can be enlisted to help their children develop self-management abilities. Working together, teachers and parents can focus on a few goals and, at the same time, support the growing independence of the students. The *Guidelines: Family and Community Partnerships* give some ideas.

GUIDELINES

Family and Community Partnerships

Applying Operant Conditioning: Student Self-Management

Introduce the system to parents and students in a positive way.

Examples

1. Invite family participation and stress possible benefits to all family members.
2. Consider starting the program just with volunteers.
3. Describe how you use self-management programs yourself.

Help families and students establish reachable goals.

Examples

1. Have examples of possible self-management goals for students such as starting homework early in the evening or keeping track of books read.
2. Show families how to post goals and keep track of progress. Encourage everyone in the family to work on a goal.

Give families ways to record and evaluate their child's progress (or their own).

Examples

1. Divide the work into easily measured steps.
2. Provide models of good work where judgments are more difficult, such as in creative writing.
3. Give families a record form or checklist to keep track of progress.

(Continued)

Encourage families to check the accuracy of student records from time to time, and help their children develop forms of self-reinforcement.

Examples

1. Have many checkups when students are first learning and fewer later.
2. Have siblings check one another's records.
3. Where appropriate, test the skills that students are supposed to be developing at home and reward students whose self-evaluations match their test performances.
4. Have students brainstorm ideas with their families for rewarding themselves for jobs well done.

For more about self-management, see https://selfmanagementforkids.org.

Challenges and Criticisms

In this section we look at some of the challenges to earlier behavioral approaches to learning as well as some important criticisms and cautions.

Beyond Behaviorism: Bandura's Challenge and Observational Learning

Over 40 years ago, Albert Bandura (1977) noted that the traditional behavioral view of learning had many limitations. Sometimes Bandura has been characterized as a neo-behaviorist, but he has corrected that label:

> At the time of my graduate training, the entire field of psychology was behaviorally oriented with an almost exclusive focus on the phenomenon of learning. But I never really fit the behavioral orthodoxy. At the time virtually all of the theorizing and research centered on learning through the effects of reinforcing outcomes. In my first major program of research, I argued against the primacy of conditioning in favor of observational learning, in which people neither emit responses nor receive reinforcements during the process of learning. (quoted in Pajares, 2008, p. 1)

Social learning theory
Theory that emphasizes learning through observation of others.

Enactive learning
Learning by doing and experiencing the consequences of your actions.

Observational learning
Learning by observation and imitation of others—vicarious learning.

In his early work, called **social learning theory**, Bandura pointed out two key distinctions between *enactive* and *observational* learning and between *learning* and *performance*.

ENACTIVE AND OBSERVATIONAL LEARNING. Bandura distinguished between enactive and vicarious, or observational, learning. **Enactive learning** is learning by doing and experiencing the consequences of your actions. This may sound like operant conditioning all over again, but it is not, and the difference has to do with the role of consequences. Proponents of operant conditioning believe that consequences strengthen or weaken behavior. In enactive learning, however, consequences are seen as providing information. Bandura emphasized that reinforcement does not "stamp in" responses but instead instills expectations and predictions about outcomes—what will happen if I do that behavior? In other words, our interpretations of the consequences create expectations, influence motivation, and shape beliefs (Schunk, 2020).

Vicarious learning is learning by observing others, so it often is called **observational learning**. For example, in one study of observational learning, college students learned as much from watching a video of a student being tutored about molecular diffusion as they did from being tutored themselves on the same subject (Muldner et al., 2014). This challenges the behaviorist idea that cognitive factors are unnecessary in an explanation of learning. If people and even animals can learn by watching another person or animal learn, they must be focusing their attention, constructing images, remembering, analyzing, and making decisions that affect learning. Thus, much is going on mentally before behaviors can even take place. Cognitive apprenticeships, discussed in Cluster 10, are examples of vicarious learning—learning by observing others.

LEARNING AND PERFORMANCE. To explain some limitations of the behavioral model, Bandura also distinguished between the acquisition of knowledge (learning) and the observable behavior based on that knowledge (performance). In other words, Bandura suggested

that we all may know more than we show. An example is found in one of Bandura's early studies (1965). Preschool children saw a film of a model kicking and punching an inflatable "Bobo" doll. One group saw the model rewarded for the aggression, another group saw the model punished, and a third group observed no consequences. When they were moved to a room with the Bobo doll, the children who had seen the punching and kicking reinforced on the film were the most aggressive toward the doll. Those who had seen the attacks punished were the least aggressive. But when the children were promised rewards for imitating the model's aggression, all of them demonstrated that they had learned the behavior.

Thus, incentives can affect performance. Even though learning may have occurred, it may not be demonstrated until the situation is appropriate or there are incentives to perform. This might explain why some students don't perform "bad behaviors" such as swearing or smoking that they all see modeled by adults, peers, and the media. Personal consequences may discourage them from performing the behaviors. In other examples, children may have learned how to write the alphabet but perform badly because their fine-motor coordination is limited, or they may have learned how to simplify fractions but perform badly on a test because they are anxious. In these cases, their performance is not an indication of their learning.

Bandura provided an alternative to the behavioral theories of the time. His work continued as he developed *social cognitive theory*—one of the most influential theories of learning and motivation in educational psychology today. We will devote Cluster 11 to a closer look at social cognitive theory.

Criticisms of Behavioral Methods

This cluster gave you an overview of several strategies for changing classroom behavior. However, you should be aware that these strategies are simply tools—they can be used either responsibly or irresponsibly. What, then, are some issues you should keep in mind?

Put Yourself in Their Place Imagine you are a graduate from my teacher education program being interviewed for your first job. The principal asks, "A teacher last year got in trouble for bribing his students with homework exemptions to get them to behave in class. What do you think about using rewards and punishments in teaching?" What will you say?

While you think about your answer to the *Put Yourself in Their Place* question, look at the *Point/Counterpoint: Should Students Be Rewarded for Learning?* to see two different prespectives. Properly used, the strategies in this cluster can be effective tools to help students learn academically and grow in self-sufficiency. Effective tools, however, do not automatically produce excellent work, and behavioral strategies are often implemented haphazardly, inconsistently, incorrectly, or superficially (Landrum & Kauffman, 2006). The indiscriminate use of even the best tools can lead to difficulties.

Just as you must take into account the effects of a reward system on the individual, you must also consider its impact on other students. Is it possible that other students will learn to be "bad" in order to be included in the reward program? Most of the evidence on this question suggests that using individual adaptations such as reward programs does not have any adverse effects on students who are not participating if the teacher believes in the program and explains the reasons for using it to the nonparticipating students. If the conduct of some students does seem to deteriorate when their peers are involved in special programs, many of the same procedures discussed in this cluster should help them return to their previous levels of appropriate behavior (Chance, 1992, 1993).

Behavioral Approaches: Lessons for Teachers

There is great diversity in the learning histories of students. Each person in your class will come to you with different fears and anxieties. Some students may be terrified of speaking in public or of failing at competitive sports. Others will be anxious around various animals. Different activities or objects will serve as reinforcers for some students but not others. Some students will work for the promise of good grades—others couldn't care less. All of your students will have learned different behaviors in their homes, neighborhoods, faith-based communities, or communities.

POINT/COUNTERPOINT: Should Students Be Rewarded for Learning?

For years, educators and psychologists have debated whether students should be rewarded for schoolwork and academic accomplishments. For example, in the early 1990s, Paul Chance and Alfie Kohn exchanged opinions in several issues of *Phi Delta Kappan* (Chance, 1991, 1992, 1993; Kohn, 1993). I have included some quotes from Kohn and Chance because the debate was "lively" and thought-provoking. A few years later, Judy Cameron and W. David Pierce (1996) published an article on reinforcement in the *Review of Educational Research* that precipitated extensive criticisms and rebuttals in the same journal from Mark Lepper, Mark Keavney, Michael Drake, Alfie Kohn, Richard Ryan, and Edward Deci (Kohn, 1996; Lepper et al., 1996; Ryan & Deci, 1996). Many of the same people exchanged opinions in the November 1999 issue of *Psychological Bulletin* (Deci et al., 1999; Eisenberg et al., 1999). In 2014, the discussion continued in *Rewards: How to Use Rewards to Help Children Learn and Why Teachers Don't Use Them Well* (Walberg & Blast, 2014). What are the arguments?

Point

Students are punished by rewards. Years ago, Alfie Kohn (1993) argued that using rewards is a way to manipulate and control—"a way of doing things to children rather than working *with* them" (p. 784). He contended that rewards are ineffective because when the praise and prizes stop, the behaviors stop too. After analyzing 128 studies of extrinsic rewards, Edward Deci, Richard Koestner, and Richard Ryan (1999) concluded that "tangible rewards tend to have a substantial effect on intrinsic motivation, with the limiting conditions we have specified. Even when tangible rewards are offered as indicators of good performance, they typically decrease intrinsic motivation for interesting activities" (pp. 658–659). Kohn agreed:

> All of this means that getting children to think about learning as a way to receive a sticker, a gold star, or a grade—or even worse, to get money or a toy for a grade, which amounts to an extrinsic motivator for an extrinsic motivator—is likely to turn learning from an end into a means. Learning becomes something that must be gotten through in order to receive the reward. Take the depressingly pervasive program by which children receive certificates for pizzas when they have read a certain number of books. John Nicholls of the University of Illinois comments, only half in jest, that the likely consequence of this program is "a lot of fat kids who don't like to read." (1993, p. 785)

Another possible problem—Herbert Walberg and Joseph Blast (2014) suggest that Millennials (those born from the early 1980s to the 2000s) have been rewarded so much for just participating, regardless of their actual performance, that they hold unrealistic expectations for recognition and promotions when they join the workforce.

Counterpoint

Learning should be rewarding. According to Paul Chance (1993):

> Skinner, unlike Kohn, understood that people learn best in a responsive environment. Teachers who praise or otherwise reward student performance provide such an environment.... If it is immoral to let students know they have answered questions correctly, to pat students on the back for a good effort, to show joy at a student's understanding of a concept, or to recognize the achievement of a goal by providing a gold star or a certificate—if this is immoral, then count me a sinner. (p. 788)

Do rewards undermine interest? R. Eisenberg and colleagues (1999) suggested, "Reward procedures requiring specific high task performance convey a task's personal or social significance, increasing intrinsic motivation" (p. 677). Even psychologists such as Edward Deci and Mark Lepper, who suggest that rewards might undermine intrinsic motivation, agree that rewards can also be used positively. When rewards provide students with information about their growing mastery of a subject or when the rewards show appreciation for a job well done, then the rewards bolster confidence and make the task more interesting to the students, especially students who lacked ability or interest in the task initially. Effective learning that leads to fast,

automatic performance in math or reading requires extensive practice, especially in the early stages. Learning without rewards is more difficult—nothing succeeds like (recognized) success. The appropriate use of rewards helps students persist in the face of challenges (Walberg & Blast, 2014). And as Chance (1993) points out, if students master reading or mathematics with the support of rewards, they will not forget what they have learned when the praise stops. Would they have learned without the rewards? Some would, but some might not. Would you continue working for a company that didn't pay you, even though you liked the work? Will freelance writer Alfie Kohn, for that matter, lose interest in writing because he gets paid fees and royalties?

Beware of Either/Or

Cross-cultural research shows that rewards and evaluations can undermine creativity and interest in Western cultures, but they actually support creativity and interest in collectivist cultures such as China, South Korea, and Saudi Arabia. To quote Beth Hennessey, who summarized the results of these studies: "Rewards can be complicated. Culture is complicated. Teaching is complicated" (2015, p. 25). Ask any experienced teacher and you will find that rewards can have a place in the classroom. In fact, life in classrooms ought to include "rewarding" experiences. Many of those rewards come naturally with learning and being a member of the classroom community. But when some students need extra structure or incentives to get going, persist, practice, or resist distractions, then rewards could help support their efforts. For some examples of positive uses of rewards, see https://thecornerstoneforteachers.com/truth-for-teachers-podcast/teachers-reward-students-theyre-supposed.

Source: From "Sticking Up for Rewards," by P. Chance, June 1993, *Phi Delta Kappan,* pp. 787–790. Copyright © 1993 by *Phi Delta Kappan*. Reprinted with permission of *Phi Delta Kappan* and the author. From "Rewards versus Learning: A Response to Paul Chance," by A. Kohn, June 1993, *Phi Delta Kappan*, pp. 783 and 785. Copyright © 1993 by Alfie Kohn. Reprinted from *Phi Delta Kappan* with the author's permission. From Hennessey, B. A. (2015). Reward, task motivation, creativity and teaching: Towards a cross-cultural examination. *Teachers College Record, 117*, 10, pp. 1–28, http://www.tcrecord.org ID Number: 18099

The research and theories presented in this cluster should help you understand how the learning histories of your students might have taught them to respond automatically to tests with sweaty palms and racing hearts—possible classical conditioning at work. Their learning histories might have included being reinforced for persistence or for whining—operant conditioning at work. The chance to work in a group may be a reinforcer for some students and a punisher for others. Remember, what works for one student may not be right for another. And students can get "too much of a good thing"; reinforcers can lose their potency if they are overused.

Even though your students will have many different learning histories, there are some convergences—principles that apply to all people:

1. No one eagerly repeats behaviors that have been punished or ignored. Without some sense of progress, it is difficult to persist.
2. When actions lead to consequences that are positive for the person involved, those actions are likely to be repeated.
3. Teachers often fail to use reinforcement to recognize appropriate behavior; they respond instead to inappropriate behaviors, sometimes providing reinforcing attention in the process.
4. To be effective, praise must be a sincere recognition of a real accomplishment.
5. Whatever their current level of functioning, students can learn to be more self-managing.

Module 24 Summary

Current Applications: Functional Behavioral Assessment, Positive Behavior Supports, and Self-Management (pp. 315–320)

How can FBA and PBS be used to improve student behaviors? In doing an FBA, a teacher studies the antecedents and consequences of problem behaviors to determine the reason or function of the behavior. Then PBS are designed to replace problem behaviors with new actions that serve the same purpose for the student but do not have the same problems.

What are the steps in self-management? Students can apply behavior analysis on their own to manage their own behavior. Teachers can encourage the development of self-management skills by allowing students to participate in setting goals, keeping track of progress, evaluating accomplishments, and selecting and giving their own reinforcers.

Challenges and Criticisms (pp. 320–323)

What was Bandura's challenge to behavioral learning? Bandura believed that the traditional behavioral view of learning had many limitations. Even though he was educated during a time when behavioral learning was dominant, his views never really fit the behavioral orthodoxy. He argued in favor of observational learning, in which people neither emit responses nor receive reinforcements during the process of learning.

Distinguish between enactive and vicarious (observational) learning. Enactive learning is learning by doing and experiencing the consequences of your actions. Vicarious (observational) learning is learning by observing, which challenges the behaviorist idea that cognitive factors are unnecessary in an explanation of learning. Much is going on mentally before performance and reinforcement can even take place. In behavioral views, reinforcement and punishment directly affect behavior. In social learning theory, seeing another person, a model, reinforced or punished can have similar effects on the observer's behavior. Social cognitive theory expanded social learning theory to include cognitive factors such as beliefs, expectations, and perceptions of self.

What is the difference between learning and performance? Social learning theory recognized the differences between learning and performance—in other words, we all may know more than we show. You can learn something but not perform it until the situation and incentives are right. Even though learning may have occurred, it may not be demonstrated until the situation is appropriate or there are incentives to perform.

What are the main criticisms of behavioral approaches? The misuse or abuse of behavioral learning methods is unethical. Critics of behavioral methods also point out the danger that reinforcement could decrease interest in learning by overemphasizing rewards and could have a negative impact on other students. Teachers must use behavioral learning principles appropriately and ethically.

Cluster 7 Review

Key Terms

Antecedents
Applied behavior analysis
Behavioral learning theories
Classical conditioning
Conditioned response (CR)
Conditioned stimulus (CS)
Consequences
Contiguity
Contingency contract
Continuous reinforcement schedule
Cueing
Effective instruction delivery (EID)
Enactive learning
Extinction
Functional behavioral assessment (FBA)
Good behavior game
Group consequences
Intermittent reinforcement schedule
Interval schedule
Learning
Negative reinforcement
Neutral stimulus
Observational learning
Operant conditioning
Operants
Positive behavior supports (PBS)
Positive practice overcorrection
Positive reinforcement
Precorrection
Premack principle
Presentation punishment
Punishment
Ratio schedule
Reinforcement
Reinforcer
Removal punishment
Reprimands
Respondents
Response
Response cost
Self-management
Self-reinforcement
Shaping
Social isolation

Social learning theory
Stimulus
Stimulus control
Successive approximations
Task analysis
Time out
Token reinforcement system
Unconditioned response (UR)
Unconditioned stimulus (US)

Connect and Extend to Licensure

Multiple-Choice Questions

1. After a long springtime filled with many bee stings, several of the kindergartners at Teddy Bear Cave Kindergarten refused to go outside for activities on the playground. Once an exterminator found and removed the nest, Miss Cochran announced the bees were gone. Later that day when Miss Cochran lined up the children to go to the playground, several of the students burst into tears and begged to not go. Which of the following would be an explanation for this event?
   - **A.** Operant conditioning
   - **B.** Successive approximations
   - **C.** Classical conditioning
   - **D.** Response cost
2. Which one of the following behavioral principles does NOT apply to all people?
   - **A.** No one eagerly repeats behaviors that have been punished or ignored. Without some sense of progress, it is difficult to persist.
   - **B.** When actions lead to consequences that are positive for the person involved, those actions are likely to be repeated.
   - **C.** To be effective, praise must be general in nature.
   - **D.** Teachers often fail to use reinforcement to recognize appropriate behavior; they respond instead to inappropriate behaviors, sometimes providing reinforcing attention in the process.
3. Several of the students in Mr. Camp's class had difficulty behaving in line. He thought he had managed to get them under control with reinforcement. He had been giving them a token every time they lined up in an orderly fashion. While it initially worked like magic, now the students were falling back into their old patterns. What type of reinforcement schedule should Mr. Camp have used after his students had mastered lining up in an orderly fashion?
   - **A.** Shaping
   - **B.** Intermittent reinforcement
   - **C.** Continuous reinforcement
   - **D.** Applied behavior analysis
4. Applied behavior analysis requires several steps for a behavior to be changed. Which of the following is NOT one of the required steps?
   - **A.** Clear specification of the behavior to be changed and careful measurement of the behavior
   - **B.** Analysis of the antecedents and consequences that might be maintaining inappropriate or undesirable behavior
   - **C.** Interventions based on behavioral principles to change the behavior
   - **D.** Concrete reinforcement for good behavior

Constructed-Response Questions

Case

Haley Williams sat in Dr. Karr's office, once again, having to explain why she could not get along with her teacher. "I don't know why she picks on me in front of the class. All I know is that when she starts to yell at me, I lose my temper. I'm not even sure what I am supposed to do! It seems like *everything* I do is wrong according to Miss Kemp. I know we have talked about getting along and how that would be better for everyone, but, Dr. Karr, I just don't like her, and she does not like me. Can't I be switched to another class?

5. Is Miss Kemp doing anything that actually contributes to Haley's poor behavior? Explain your answer.
6. What could one assume about Miss Kemp's reprimands if Haley's behavior has not decreased?

What Would They Do?

Teachers' Casebook: Sick of Class

At the beginning of this cluster, we asked you to think critically about how to help the student who got "sick" before oral presentations. Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Robert John Hovel Jr. • 11th and 12th Grade AP Psychology Teacher
Lyman High School, Longwood, FL

If this were a student in my classroom, I would take him aside and ask him directly about his visits to the nurse's office and why they were so frequent. As the teacher, I would know he is

exhibiting anxiety when having to speak in front of others, but he may be experiencing anxiety for a variety of reasons. Many reasons a boy could experience anxiety could include insecurity about his speaking voice, his physical appearance, or reliving an experience that has conditioned him to experience anxiety when having to speak in front of others. Once I had built trust in the student and had taken him aside, I would want to ask if there was anything in the past that happened that would possibly be causing his fear, as well as anything I could do as his teacher to help him work on his anxiety. I would want to form a plan of action with him and let him know that he is not having to face his anxiety alone. Letting the student know he has support is the goal overall so he can learn about what makes him anxious, know how to cope, and then ensure his success in my class. This could not only apply for my class, but for his future classes, he will be able to perform and not make so many trips to the nurse's office to escape from his anxiety.

Tiffany Al-Lateef • Kindergarten–1st Grade Teacher

KIPP Columbus Primary, Columbus, OH

This could be a case of classically conditioned phobia. The student's behavior appears to be triggered by oral assignments and speaking in class. As his teacher I would monitor my actions and document whether I am triggering this response from the student. I would also communicate with his family and the nurse to see if there is information that could help me better understand my student.

The function of the behavior is escaping or avoiding speaking in class. To support positive behaviors in my student, I would first take the time to communicate with my student and his family to see if a speech referral is needed. For this student I would incorporate positive rewards for speaking. I would provide positive feedback often to motivate him to speak or contribute to class discussions. During class, I would offer opportunities for him to write his responses, pair him with a more vocal student for group lessons, lastly, I would allow him to do fun activities like readers theater.

I think rewards would be useful in this situation. As a reward he can then step away and visit the nurse or a favorite teacher. I believe by punishing the student, it would only cause more harm.

Nicole Macpherson • Kindergarten–12th Grade District Learning Support Consultant

Burnaby School District, Burnaby, British Columbia, Canada

I always think of students' behavior as communication; there is always an underlying message connected to their actions that serve particular functions to help them in particular environments. If there is a student who continuously leaves my classroom for reasons that may be curious, I look for clues as to why this is happening through multiple forms of data collection (e.g., student's engagement with certain subjects, what kind of learner is the student, interview with colleagues, my own observations, conference with the student). Knowing that this student leaves class during oral activities (function appears to be escape), it would be important to implement Tier 1 strategies to scaffold this student's learning in oral tasks in age respectful ways. Strategies such as giving this student extra time to respond, providing specific and timely positive reinforcement or feedback, modeling responses, offering full-partial scripts before the activity, and previewing vocabulary will be very helpful to this student. After explicitly teaching these strategies I would monitor and assess if the student is in fact making progress. If so, then we continue offering these supports to him and everyone in the class; who knows who else in my class will benefit from these great strategies! Finally, I would encourage this student to self-advocate and ask for supports as we continue throughout the year. After all, my goal is to empower all students with the skills they need to become successful self-advocates. If, however, the student is not responding to the Tier 1 supports I've implemented, I would alter them and try other evidence-based Tier 1 strategies for a defined period of time. If my student continues to be unresponsive to these strategies, I would reach out to my school-based team for further support (e.g., from the learning support teacher, counselor, school psychologist) to see how we could support him to become successful with oral tasks.

Valerie S. Fields • 11th–12th Grade AP Psychology Teacher

Eagle's Landing Christian Academy, McDonough, GA

The first thing I would do is meet privately with the student. I would let him know I noticed a correlation between assignments that involve public speaking and asking to see the nurse. I would be straight up with him and let him know that I had already followed up with the nurse regarding his increasing visits. I would inquire about the symptoms that prompt the visits to the nurse. If that were something that the student was comfortable discussing, this would be a fantastic opportunity to talk about how stress can impact our physical health and the ways that it manifests in us. I would make it clear the avoidant behavior was a short-term solution that was nearing its expiration date. If the student desired to change this avoidant behavior, I would ask him to come up with five public speaking situations that he might encounter in class and put them in order starting with the least stressful situation to the most stressful. I would make a deal for the first week or so that if a public speaking situation came up in class, I would not call on him or require his participation. Depending on the material/content I may ask for a written submission to replace the public speaking portion. In turn, I would not expect any requests to go to the nurse. I would set up the situations listed in his hierarchy and give him plenty of head's up on when it was going to happen. In the meantime, I would assign different stress reducing strategies (deep breathing, positive visualization, prayer or meditation) to practice. Beginning with the least stressful situation, I would create opportunities in class for him to interact publicly while utilizing stress reducing strategies. Once the student felt he had reached a level of comfort and accomplishment, I would increase the level of difficulty. I would share my own struggles with public speaking that include hot flashes, turning beet red, and shaky voice syndrome (I made that last thing up). Just last week I was reminded that students are shocked when you can give them

examples of personal struggles. They tend to think adulthood is smooth sailing on an ocean of contentment with rainbow sprinkles and sunshine. God bless them!

Paula Colemere • Special Education, English, and History Teacher

McClintock High School, Tempe, AZ

If this is a chronic issue, I would conduct a functional behavior assessment (FBA) and develop a behavior intervention plan (BIP) to address the student's needs. The real problem here is the student's avoiding a task that he does not want to participate in. I would work with this student to find a way to make the task less daunting and try to ease his fears. If the student is just nervous about speaking in front of class, as many students are, maybe he can present in front of a smaller group. This way, the student is still working on the skill. I have had students who are terrified to read in class practice a small part of a passage with me to build confidence, and then I call on them in class to read in front of peers. If just escaping class is the function of the behavior, I would look to find a replacement for seeing the nurse. This would be tied to completing the task first. For example, "After you answer your question, you can deliver this to the office." This offers the student the movement as a reward for completing the task.

Linda Sparks • 1st Grade Teacher

John F. Kennedy School, Billerica, MA

Every year, we always have a few "frequent flyers" to the nurse. Sometimes it is as simple as he didn't complete an assignment, he is afraid he will make a mistake, or maybe something is happening at home. I had one student who tried to make himself sick daily. It was a new behavior, and we were trying to figure out what was going on. We called home and the parents assured us nothing had changed. We eventually found out that the parents were selling their home and the student overheard them talking on the phone about moving and looking at houses. After days of trying to put this together, he finally shared with me that he was afraid to be at school because he thought his mommy and daddy were going to move while he was at school and no one would be home when he got there. This is another instance where time is needed, trust needs to be earned, and compassion needs to be present.

Jessica N. Mahtaban • 8th Grade Math Teacher

Woodrow Wilson Middle School, Clifton, NJ

I would first speak to the student alone and discuss my concerns. Together we would try to find a way for him to come up with various solutions to facing his fear. Maybe the student could start by just presenting to me and gradually we could add more people to the group until he is comfortable with the whole class. Or the student could tape record his presentation and play it to the class as part of the group presentation. If it were a severe case of a phobia, I would involve the school counselor, administration, school psychiatrist, the student, and, of course, his parents. Together we could address the child's needs. I don't feel rewards or punishment would help this situation. Students need to learn how to handle their problems on their own without always having a reward once the task is accomplished. Nor is it fair to feel the pressure of being punished if the task is not completed. The goal is to have all students be intrinsically motivated; in turn, this will help them to be prepared for the real world.

Jennifer Pincoski • Kindergarten–12th Grade Learning Resource Teacher

Lee County School District, Fort Myers, FL

The student's apparent anxiety over public speaking needs to be acknowledged. Punishing him or forcing him to participate will only worsen the situation.

Several things can be done to ease the student's anxiety. The teacher can meet with him beforehand to go over the assignment and let him practice without an audience. Students can then be divided into pairs so they only have to present to one other person; the first time, he can even be permitted to select his own partner (discussed privately, so he does not feel embarrassed). The pairs can gradually be increased to groups of three, four, and so on. Pairs and groups can be rotated so the student presents to all of his classmates, a few at a time. Students can also be paired up to work on the assignment and present it together.

The process of increasing this student's confidence with oral presentations will take time; patience and positive reinforcement are critical. Ultimately, it is most important to make sure he has adequate means of demonstrating his learning and being assessed on content objectives.

Lauren Rollins • 1st Grade Teacher

Boulevard Elementary School, Shaker Heights, OH

This student is clearly uncomfortable speaking in class. Punishing him for this would be a huge mistake! Instead, I would have an individual conference with him. During our meeting, I would tell him that I have noticed his frequent trips to the nurse when public speaking situations occur, and I would like to help him to overcome his fear. I would start by assuring him that his thoughts are important to me and offering him the opportunity to respond by writing his answers down, rather than sharing them aloud. I would also offer him the opportunity to give his oral presentations to me privately. Then I would slowly raise my expectations for his class participation—asking him to contribute one response aloud each week, then twice, and so on. I would praise him and reward him for this in a way that would be motivating and meaningful to him. I would continue to add to my expectations until he felt comfortable being a participant in class discussions. As for oral presentations, as he became comfortable presenting to me one-on-one, I would ask him to invite one or two friends to his presentations and then a small group. My goal would be for him to slowly feel more and more comfortable presenting to a group of his choice. Eventually, my expectations for him would be the same as my expectations for the rest of his peers.

Cluster 8

Cognitive Views of Learning



Mahira N. M. A., Age 3, Jakarta, Indonesia

Teachers' Casebook:

Remembering the Basics

What Would You Do?

You have just graded the first large unit test of the year. About two-thirds of the students seem to have mastered the material and understood the key ideas. The other third, however, appear totally lost. Recall of basic vocabulary and facts seems to be the stumbling point for these students, slowing down their learning as they struggle to remember the basics. This basic knowledge is the foundation students must know before they can move on to the more complicated work in the next unit.

Critical Thinking

- How could you help students retain and retrieve the necessary information?
- What are your options besides a rote memory approach?
- How would you use what the students already know to help them learn in better, more meaningful ways?
- How will these issues affect the grade levels you will teach?

Overview and Objectives

In this cluster, we turn from behavioral theories of learning to the cognitive perspective. This means a shift from "viewing the learners and their behaviors as products of incoming environmental stimuli" to seeing the learners as "sources of plans, intentions, goals, ideas, memories, and emotions actively used to attend to, select, and construct meaning from stimuli and knowledge from experience" (Wittrock, 1982, pp. 1–2). We will begin with a discussion of the general cognitive approach to learning and memory and the importance of knowledge in learning. To understand memory, we will consider early information processing models of memory, along with the recent improvements on those models suggested by findings in the interdisciplinary fields of cognitive science. These new models point to key processes of working memory, cognitive load, and knowledge. Then we turn to ideas about how teachers can help their students become more knowledgeable. By the time you have completed this cluster, you should be able to:

8.1 Differentiate between behavioral and cognitive views of learning, including the role of knowledge in the cognitive view.

8.2 Explain early information processing models of memory and recent cognitive science models, including working memory, cognitive load theory, and individual differences in working memory.

8.3 Describe current views of long-term memory, particularly the contents and types of long-term memory, individual differences, and the processes of retrieving information from long-term memory.

8.4 Describe strategies for supporting students' construction of long-lasting knowledge.

OUTLINE

Teachers' Casebook—Remembering the Basics: What Would You Do?
Overview and Objectives

MODULE 25: The Basics of the Cognitive Science Perspective
Elements of the Cognitive Perspective
The Brain and Cognitive Learning
The Importance of Knowledge in Cognition

Cognitive Views of Memory
Sensory Memory
Working Memory
Cognitive Load and Retaining Information in Working Memory
Individual Differences in Working Memory
Is Working Memory Really Separate?

MODULE 26: Understanding Long-Term Memory
Long-Term Memory
Capacity and Duration of Long-Term Memory
Contents of Long-Term Memory: Explicit (Declarative) Memories
Contents of Long-Term Memory: Implicit Memories

Retrieving Information in Long-Term Memory
Individual Differences in Long-Term Memory

MODULE 27: Putting It All Together: Memorable Learning
Teaching for Long-Lasting Knowledge: Basic Principles and Applications
Constructing Declarative Knowledge: Making Meaningful Connections
Reaching Every Student: Make It Meaningful
If You Have to Memorize…
Lessons for Teachers: Declarative Knowledge
Development of Procedural Knowledge

Cluster 8 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Remembering the Basics: What Would They Do?

MODULE 25 The Basics of the Cognitive Science Perspective

Learning Objective 8.1 Differentiate between behavioral and cognitive views of learning, including the role of knowledge in the cognitive view.

Learning Objective 8.2 Explain early information processing models of memory and recent cognitive science models, including working memory, cognitive load theory, and individual differences in working memory.

Elements of the Cognitive Perspective

The cognitive view is both the oldest and one of the youngest perspectives in psychology. It is old because discussions of the nature of knowledge and the value of reason date back at least to the ancient Greek philosophers (Gluck et al., 2020). From the late 1800s until several decades ago, however, cognitive studies fell from favor and behaviorism thrived, with its emphasis on laws of learning that apply to all higher organisms (Lee, 2016). But today, there is renewed interest in mental processes. The focus now is the scientific study of memory and cognition—"understanding how the mind works, conducting empirical research into how people perceive, remember, and think" (Brown et al., 2014, p. 8). This **cognitive view of learning** can be described as a generally agreed-upon orientation that assumes humans are active information processors. Older cognitive views emphasized the *acquisition* of knowledge, but newer approaches stress its *construction* (Mayer, 2011; Ormrod, 2020). In the past few years, the study of memory and cognition has become interdisciplinary and often is called **cognitive science**—the study of thinking, language, artificial intelligence (AI), and the brain (Anderson, 2020).

Cognitive view of learning
A general approach that views learning as an active mental process of acquiring, remembering, and using knowledge.

Cognitive science
The interdisciplinary study of thinking, language, artificial intelligence (AI), and the brain.

The Brain and Cognitive Learning

The human brain is made up of many different modules with specialized functions—recognizing faces, processing auditory information, extracting meaning from pictures, representing categories and concepts, forming new memories, coordinating movements, and many more. All these modules work together to make sense of your ongoing experiences and to learn. Throughout life, every time you learn, you change your brain (Anderson, 2020; Brown et al., 2014).

A large part of the human cortex, more than 50%, is devoted to processing visual information. Observing and visualizing support learning because the brain automatically responds to these types of stimulation. When you actually look at an object, a certain area of the brain is activated. Just mentally visualizing the object activates at least two-thirds of the same area of the brain (Ganis et al., 2004). When you observe someone perform an action,

the area of your brain that would be involved in actually doing the action is activated just by watching—the brain rehearses the action it sees another person perform. These areas of the brain that fire both during perception of an action and when actually performing the action have been called *mirror neurons* in monkeys (where they were first discovered) and **mirror systems** in humans because the activated areas in humans contain millions of neurons (Anderson, 2020; Ehrenfeld, 2011). These mirror systems help explain why social interactions and mimicking the words or actions of others have powerful effects on learning, especially learning languages, because these interactions help the brain rehearse and refresh the actions involved in learning (Schwartz et al., 2019).

Mirror systems
Areas of the brain that fire both during perception of an action by someone else and when performing the action.

Connections among neurons throughout the brain are always changing in response to experiences, and this change, this neural plasticity, is the basis for memory. When we experience an event, different neurons in the brain fire together. Then, when we remember that event, the same neurons fire together again. With repeated activation, these neurons stabilize as a network through the hippocampus—a critical area of the brain for learning and forming new memories. Finally, the networks become memories stored in the neocortex, the thin outer layer of the brain. The hippocampus is critical for learning but also is affected by learning (plasticity again). For example, the hippocampus is larger in taxi drivers than in other car drivers, and this increased size is related to the length of time the person has been driving a taxi. The explanation is this part of the brain grew larger because it was used more in navigating around the city. This same part of the brain is one of the first areas affected by Alzheimer's disease, which may help explain why people with Alzheimer's get lost even in familiar surroundings—their brain's navigation system is failing (Gluck et al., 2020; Sleek, 2015).

Because of the continuing development of the brain, particularly the prefrontal cortex, by about age 7 or 8, children become more able to integrate past and present experiences. An infant or a toddler reacts impulsively, but the 8-year-old can remember and reflect. Analysis, control, abstraction, memory space, speed of processing, and interconnection of information make self-regulation and continuing cognitive development possible, as we will see throughout this text.

Many of the developmental and brain changes related to learning involve knowledge—a key element in the cognitive perspective.

The Importance of Knowledge in Cognition

Stop & Think Quickly list 10 terms that pertain to educational psychology. Now list 10 terms that relate to ceramic engineering.

When you read *Stop & Think*, unless you are studying ceramic engineering, it probably took you longer to list 10 terms from that field than from educational psychology. Some of you may still be asking, "What is ceramic engineering anyway?" Your answers depend on your knowledge. (Think fiber optics, ceramic teeth and bones, ceramic semi-conductors for computers, and heat-shielding tiles for space shuttles.)

Knowledge and knowing are the outcomes of learning. When we learn the history of cognitive psychology, the products of ceramic engineering, or the rules of tennis, we know something new. However, knowing is more than the end product of previous learning; it also guides new learning. Knowledge determines to a great extent what we will pay attention to, perceive, learn, remember, and forget (Bransford et al., 2000; Ormrod, 2020). Generally, what we know is helpful in learning because we build on current knowledge through *conceptual growth* and expansion. For example, compared to fourth-graders with little knowledge of soccer, fourth-graders who were soccer experts learned and remembered far more new soccer terms, even though the abilities of the two groups to learn and remember nonsoccer terms were the same. The difference was the soccer experts used their soccer knowledge to organize and cluster the soccer terms, which helped them remember (Schneider & Bjorklund, 1992). But at times, as we will see later, what we know is not helpful but instead misleading because we hold misconceptions about what we are trying to learn. In these situations, *conceptual change* rather than conceptual growth leads to understanding (APA, 2015; Lucariello et al., 2016).

Domain-specific knowledge
Information that is useful in a particular situation or that applies mainly to one specific topic.

General knowledge
Information that is useful in many different kinds of tasks; information that applies to many situations.

GENERAL AND SPECIFIC KNOWLEDGE. Knowledge in the cognitive perspective includes both domain-specific and general knowledge. **Domain-specific knowledge** pertains to a particular task or subject. For example, knowing that the shortstop plays between second and third base is specific to the domain of baseball. Some knowledge, on the other hand, is general—it applies to many different situations. For example, **general knowledge** about how to read or focus your attention is useful both in and out of school.

Of course, there is no absolute line between general and domain-specific knowledge. When you were first learning to read, you may have studied specific facts about the sounds of letters. At that time, knowledge about letter sounds was specific to the domain of reading. But now you can use both knowledge about letter sounds and the ability to read in more general ways. And learning in school usually requires both domain-specific and general knowledge and skills (Träff et al., 2020). For example, Steven Hecht and Kevin Vagi (2010) followed students from fourth through fifth grade as the students were learning about fractions. Difficulty mastering fractions was associated with both lack of specific knowledge about fractions and lack of general knowledge about how to behave and pay attention in class.

Another way to categorize knowledge is as *declarative, procedural*, or *self-regulatory* (Schraw, 2006). You will encounter these terms throughout this cluster.

DECLARATIVE, PROCEDURAL, AND SELF-REGULATORY KNOWLEDGE. **Declarative knowledge** is knowledge that can be declared, through words and symbol systems of all kinds—Braille, sign language, dance or musical notation, mathematical symbols, and so on. Declarative knowledge is "knowing that" something is the case. The range of declarative knowledge is tremendous. You can know very specific facts (the atomic weight of gold is 196.967) or generalities (leaves of some trees change color in autumn) or personal preferences (I don't like lima beans) or rules (to divide fractions, invert the divisor and multiply). Small units of declarative knowledge can be organized into larger units; for example, principles of reinforcement and punishment can be organized in your thinking into a theory of behavioral learning.

Procedural knowledge is "knowing how" to do something such as divide fractions or design a website; it is knowledge in action. Procedural knowledge must be demonstrated. Notice that repeating the rule "to divide fractions, invert the divisor and multiply" shows declarative knowledge. The student can state the rule. But to show procedural knowledge, the student must act. When faced with a fraction to divide, the student must divide correctly. Students demonstrate procedural knowledge when they translate a passage into Spanish, correctly categorize a geometric shape, or craft a coherent paragraph. Procedural knowledge is applied almost automatically. You don't have to think about it.

Declarative knowledge
Verbal information; facts; "knowing that" something is the case.

Procedural knowledge
Knowledge that is demonstrated when we perform a task; "knowing how."

Self-regulatory knowledge (sometimes called *conditional knowledge*) is knowing how to manage your learning—knowing how and when to use your declarative and procedural knowledge (Schraw, 2006). It takes self-regulatory knowledge to know when to read every word in a text and when to skim or when to apply a strategy for overcoming procrastination. For many students, this kind of knowledge is a stumbling block. They have the facts and can do the procedures, but they don't seem to understand how to apply what they know at the appropriate time. Self-regulatory knowledge can be specific to a subject area (when to use the formula for calculating area, not perimeter, in geometry) or more general (how to summarize key points or use diagrams to organize information).

Self-regulatory knowledge
Knowing how to manage your learning, or knowing how and when to use your declarative and procedural knowledge.

To have knowledge of something is to remember it over time and find it when you need it. Cognitive psychologists have studied memory extensively and have learned more about knowledge in the process. What have they learned?

Cognitive Views of Memory

Let's step into Elizabeth's classroom again. This time she is teaching fifth grade and introducing the division of fractions (Woolfolk, 1993, pp. 267–268):

> "Today we start a new unit on fractions—division. We will learn how you divide fractions, for example ¾ divided by ½. It is really pretty simple. To divide a fraction, you just invert the divisor and multiply." Elizabeth goes to the whiteboard and writes:
>
> $$¾ \div ½ = ?$$

> "OK, you keep your first term the same. OK, ¾ remains ¾. When you divide fractions, it says, well, to divide fractions we have to change the operation to multiplication and then flip or invert the second number. Not the first one, the second number. You look at the sign. It says change it to multiplication, and the number after the sign is the one you invert. Does that make sense? OK, then it is just a matter of multiplication—very simple."
>
> $$¾ \times ²⁄₁ = ?$$

So what is going on here? What would it take for Elizabeth's students to learn how to divide fractions and then remember what they learned? First, they need quite a bit of knowledge—declarative knowledge about the meaning of terms such as *multiply, divide, invert, fraction, sign, first, second, divisor*, and *numerator*. They need procedural knowledge about how to do things like *invert, multiply*, and *divide*. They also probably need some self-regulatory knowledge about how to keep paying attention when their mind starts to wander or how to make some quick notes when their brain seems to get too full to remember the teacher's instructions.

But how do Elizabeth's students actually learn and remember the procedure for dividing fractions? Later in the cluster, we will return to Elizabeth's classroom to see that deep understanding is more than remembering a procedure. But for now, we just focus on how students learn the procedure. The simple version is this. The students must take in the new information that Elizabeth is giving them, hold on to it while they pull from memory the knowledge they need about terms and other procedures, and then combine that incoming information with remembered knowledge to make sense of the new information. Unfortunately, the space available to combine the new and remembered information, called *working memory*, is not very large and easily overwhelmed. Once students understand, they have to remember because learning is about what you remember. We will spend the rest of the cluster examining the well-researched human information processing system for learning and memory—its possibilities and limitations. Knowledge about this system will give you a foundation for successful teaching (Willingham, 2009).

Early **information processing** views of memory used the computer as a model. Like the computer, the human mind takes in information, performs operations on it to change its form and content, stores the information, retrieves it when needed, and generates responses to it (R. C. Atkinson & Shiffrin, 1968). According to this model, stimuli from the environment (input) flow into the *sensory registers*, where some information is encoded and moves to *short-term memory*. Short-term memory holds information very briefly, combines it with information from *long-term memory*, and, with enough effort, moves some information into long-term memory storage.

Information processing
The human mind's activity of taking in, storing, and using information.

This model proved helpful but also incomplete. For example, in the model, information moved through the system mostly in one way, from sensory registers to short-term memory to long-term memory, but research indicated that there are many more interactions and connections among the processes. The model could not explain how out-of-awareness memories or knowledge could influence learning or how several cognitive processes could happen simultaneously—like many small computers operating together.

Today, cognitive science views cognition as the operation of a very complex but coordinated system of multiple memory components interacting rapidly and simultaneously. This newer perspective retains some of the features of the old approach, but emphasizes the role of working memory, attention, and the interactions among the elements of the system, as shown in Figure 8.1 on the next page, which is based on several sources (Anderson, 2020; Radvansky & Ashcraft, 2018; Schunk, 2020).

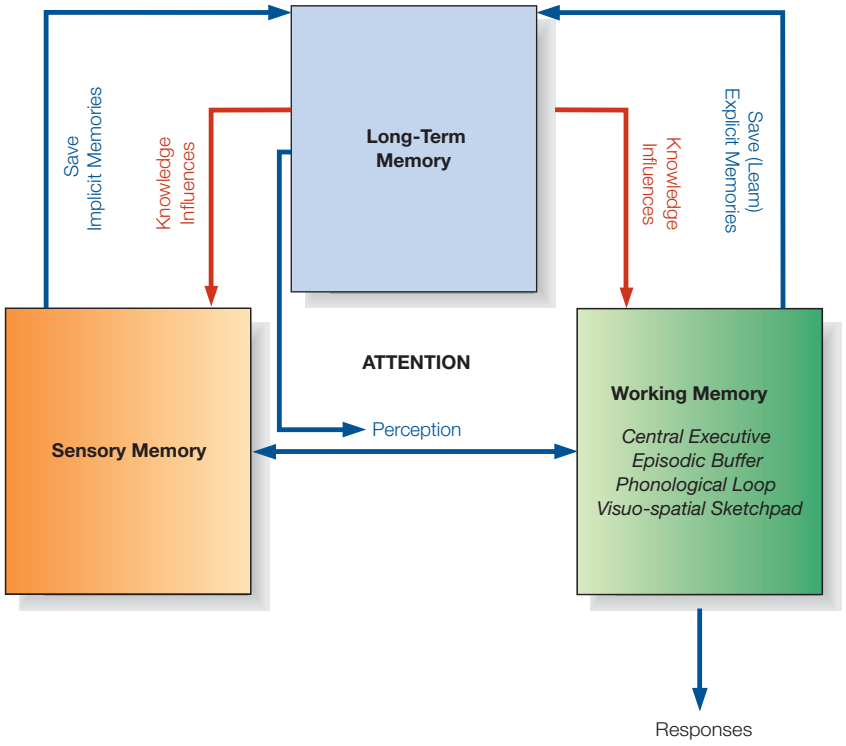
To understand this model, let's examine each element more carefully.

Sensory Memory

Stimuli from the environment (sights, sounds, smells, Elizabeth's words, etc.) constantly bombard our body's mechanisms for seeing, hearing, tasting, smelling, and feeling. Except for smells, these sensory inputs first go to the thalamus and then on to the specific area of the brain cortex that processes each kind of input. A large area of the cortex is devoted

Figure 8.1 A Recent Version of the Information Processing System

Information is encoded in sensory memory, where perception and attention determine what will be held in working memory for further use. In working memory, executive processes manage the flow of information and integrate new information with knowledge from long-term memory. Thoroughly processed and connected information becomes part of long-term memory and, when activated again, becomes part of working memory. Implicit memories are formed without conscious effort. All three elements of the system interact with each other. Attention has a role in all three memory processes and in the interactions among them.



Sensory memory
System that holds sensory information very briefly.

to processing visual information. **Sensory memory** is the initial processing that transforms these incoming stimuli into perceptions that include meaning such as "Oh, that sound is my doorbell—hope it's my Amazon delivery" (Schunk, 2020).

CAPACITY, DURATION, AND CONTENTS OF SENSORY MEMORY. The capacity of sensory memory is very large, and it can take in more information than we can possibly handle at once—about 99% has to be discarded. But this vast amount of sensory information is fragile in duration. It lasts less than 3 seconds.

Stop & Think Wave a pencil (or your finger) back and forth before your eyes while you stare straight ahead. What exactly do you see? Pinch your arm and let go. What do you feel just after you let go?

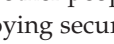
You just experienced this brief holding of sensory information in your own sensory memory. You could see a trace of the pencil after the actual stimulus had been removed and feel the pinch after you let go. Your sensory memory held information about the stimuli very briefly after the actual stimulus had ended (Lindsay & Norman, 1977).

The information content of sensory memory resembles the sensations from the original stimulus. Visual sensations are coded briefly as images, almost like photographs. Auditory sensations are coded as sound patterns, similar to echoes. It may be that the other senses also have their own codes. Thus, for a second or so, a wealth of data from sensory experience remains intact. In these moments, we have a chance to select and organize information for further processing. Perception and attention are critical at this stage.

PERCEPTION. The process of detecting a stimulus and assigning meaning to it is called **perception**. This meaning is constructed based on both physical representations from the world and our existing knowledge. For example, consider these marks: **13**.

Perception
Interpretation of sensory information.

If asked what the letter is, you would say, "B." If asked what the number is, you would say, "13." The actual marks remain the same; their meaning changes in keeping with your expectation to recognize a letter or a number and your knowledge of what Arabic numbers and the Latin alphabet look like. To a child without appropriate knowledge, the marks would probably be meaningless.

The process from sensory input to recognized objects probably goes through several stages. In the first phase, features are extracted, or analyzed, to give a rough sketch. This feature analysis has been called *data-driven* or **bottom-up processing** because the stimulus must be analyzed into features or components and assembled into a meaningful pattern "from the bottom up." For example, a capital letter A consists of two relatively straight lines joined at a 45-degree angle and a horizontal line through the middle. Whenever we see these features, or anything close enough, including A, A, A, A, A, A, and A, we are on the road to recognizing an A (Anderson, 2020). This explains how we are able to read words written in other people's handwriting and why humans, but not computer bots, can fill in those annoying security codes such as , called CAPTCHAs (Completely Automated Public Turing test to tell Computers and Humans Apart).

Bottom-up processing
Perceiving based on noticing separate defining features and assembling them into a recognizable pattern.

As perception continues, the features may be organized into patterns. These processes were studied in Germany early in the 20th century (and later in the United States) by psychologists called *Gestalt theorists*. **Gestalt**, which means "pattern" or "configuration" in German, refers to people's tendency to organize sensory information into patterns or relationships. Figure 8.2 on the next page presents a few Gestalt principles.

Gestalt
German for *pattern* or *configuration*. Gestalt theorists hold that people organize their perceptions into coherent wholes.

If all perception relied only on feature analysis and Gestalt principles, learning would be very slow. Luckily, the features and patterns detected are combined in light of the context of the situation and our existing knowledge—called *conceptually driven* or **top-down processing**. So to recognize patterns rapidly, in addition to noting features, we use context and what we already know about the situation—our knowledge about words or pictures or the way the world generally operates. For example, when you see a large four-legged animal in the distance on a city street, you probably perceive a dog, not a goat. In Figure 8.1, the role of knowledge in perception is represented by the arrows between long-term memory (stored knowledge), working memory, and sensory memory.

Top-down processing
Making sense of information by using context and what we already know about the situation; sometimes called *conceptually driven perception*.

THE ROLE OF ATTENTION. If every variation in color, movement, sound, smell, temperature, and other features ended up in working memory, life would be impossible. Early on, so we are not bombarded, a part of the brain called the *reticular activating system* filters these masses of stimuli, mostly without any conscious effort on our part (Schunk, 2020). For the stimuli that get through the filter, there is a distinction between *stimulus-driven attention* and *goal-directed attention*. With stimulus-driven attention, some sight, sound, smell, and so on, just "grabs" our attention. We hear a horn honk and immediately look for the source. Goal-directed attention is more intentional, as when we search for the cup in one of those frustrating hidden figures tests. It appears that different brain systems control these two types of attention (Anderson, 2020).

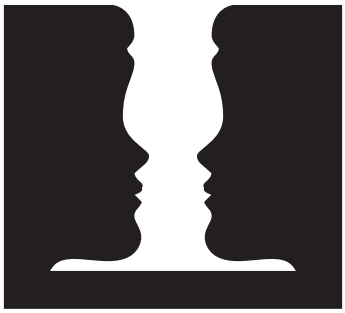
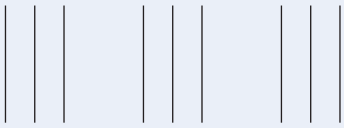
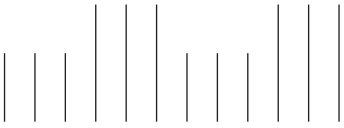
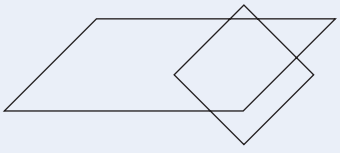
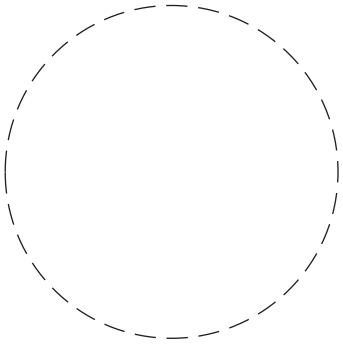
As processing proceeds, **attention** becomes more conscious and selective. What we pay attention to is guided to a certain extent by what we already know and what we need to know, so attention is involved in and influenced by all three memory processes shown in Figure 8.1. Attention is also affected by what else is happening at the time, the type and complexity of the task, the resources you bring to the situation, your expectations, and your ability to control or focus your attention. As children mature, they are more able to attend selectively, in part because selective attention is closely related to the maturing of the prefrontal cortex of the brain (Wetzel et al., 2019). Some students with attention-deficit disorder have great difficulty focusing attention or ignoring competing stimuli, so they have trouble overcoming stimulus-driven attention to focus on goal-directed attention.

Attention
Focus on a stimulus.

But attention takes effort and is a limited resource. You probably have to work a bit to pay attention to these words about attention, just like Elizabeth's students had to hang in as

Figure 8.2 A Few Examples of Gestalt Principles

Gestalt principles of perception explain how we "see" patterns in the world around us.

GESTALT PRINCIPLE	EXAMPLE	EXPLANATION
Figure-Ground		What do you see? Faces or a vase? Make one figure—the other ground.
Proximity		You see these lines as 3 groups because of the proximity of the lines.
Similarity		You see these lines as an alternating high/low pattern because of the similarity in heights of lines.
Proximity Outweighing Similarity		Even though one line is short and one is taller, you see four groups of two lines each because the dissimilar two lines are closer together.
Common Direction		You see the elements of the pattern going in one direction.
Simplicity		You are likely to see the figures as two intersecting rectangles rather than five different odd shapes.
Closure		You perceive a circle instead of a series of curved lines.

Source: Based on Schunk, D. H. (2020). *Learning theories: An educational perspective*, 7th ed. Reprinted by permission of Pearson Education, Inc.

she attempted to explain division of fractions. We can pay attention to only one cognitively demanding task at a time (Sternberg & Sternberg, 2012). For example, when I (Anita in this cluster) was learning to drive, I couldn't listen to the radio and drive at the same time. After some practice, I could listen, but I had to turn the radio off when traffic was heavy. After years of practice, I can plan a class, listen to the radio, and carry on a conversation as I drive. This is possible because many processes that initially require attention and concentration become automatic with practice.

Actually, **automaticity** probably is a matter of degree; we are not completely automatic, but rather more or less automatic in our performances depending on how much practice we have had, the situation, and whether we are intentionally focusing our attention and directing our own cognitive processing. For example, even experienced drivers might become very attentive and focused during a blinding blizzard—and no one should text or talk on a cell phone while driving. About nine people die and more than 1,000 are injured *every day* as a result of texting, talking on a phone, or eating while driving, and hands-free equipment *does not* help (CDC, 2019). Nobody's driving is automatic enough to deal with these kinds of distractions.

Automaticity
The ability to perform thoroughly learned tasks without much mental effort.

ATTENTION AND MULTITASKING. Speaking of distracted driving, drivers who text or chat on the phone say they are *multitasking* and think all is fine. Adolescents are multitasking more than ever, perhaps because they have access to so much technology. For example, college students doing reading assignments may monitor their Instagram page (open on another device while they study), stop reading to send an email or text to a TA for their course, interrupt the reading again to respond to a text from a friend, get bored (clearly not reading this book), and browse the Internet.… Texts, emails, social networking sites, and ever-present phones all demand our attention. Multitasking seems like the only reasonable response to these demands, but is it a good idea? As usual, it depends (see the *Point/Counterpoint*).

POINT/COUNTERPOINT: What's Wrong with Multitasking?

You may be multitasking right now. If so, close your Snapchat, Instagram, YouTube, Facebook, Twitter, Pinterest, Reddit, TikTok, and email pages, and consider the arguments against and for multitasking.

Point

Multitasking is bad for your brain. In an article titled "Why the Modern World Is Bad for Your Brain," Daniel Levitin (2015) cites fellow neuroscientist Earl Miller, one of the world's foremost experts on divided attention. Miller cautioned that our brains are "not wired to multitask well.… When people think they're multitasking, they're actually just switching from one task to another very rapidly. And every time they do, there's a cognitive cost in doing so" (Levitin, 2015, p. 2). According to Levitin, even though we think we're getting a lot done, we are actually less efficient, more stressed, and basically overstimulated. Multitasking creates an addiction-like feedback loop. Novelty produced by switching tasks releases dopamine, which makes us want more novelty, leading to more multitasking. Toggling between tasks is rewarded with a burst of opioids—brain candy—there is no learning, but it sure feels good. In addition, shifting attention burns the very kind of glucose fuel in your brain that you need to stay focused, so multitasking depletes this fuel quickly and causes you to feel exhausted, anxious, and even aggressive.

Other research shows that if you try to learn while multitasking, the new information goes to the wrong part of your brain, not to the hippocampus, where it can be organized into more lasting memories (Foerde et al., 2006). As soon as you turn your attention to something else, the brain starts to lose connections to what you were thinking about, like the case analysis for your educational psychology assignment. To find that brain pathway again means repeating what you did to find the path in the first place, so completing the case analysis takes more time. In fact, it can take up to 400% longer to do a homework

assignment if you are multitasking (Paulos, 2007). One study found that adults spend almost 50% of their waking hours thinking about something other than what they were currently doing—like homework (Killingsworth & Glibert, 2010). As Shalena Srna and her colleagues (2018) said, "Although the term [multitasking] refers to the concurrent execution of multiple tasks, most tasks that require attention cannot be done simultaneously" (p. 1942). Bottom line—performance suffers when you try to multitask (Koch et al., 2018).

Counterpoint

Multitasking can be effective—for a very few. Multitasking is common and may work, but only for those people Jason Watson and David Strayer (2010) call "supertaskers." The researchers tested 200 undergraduates in a driving simulator; in addition to focusing on driving, they were multitasking by learning a list of words and simultaneously doing mental math. For the vast majority of drivers, performance—both driving and learning—suffered while they were multitasking. But for a *very* small number (5 out of the 200), performance did not suffer. A study of high school students found that about 15% of the participants performed better on simple tasks while they listened to music, had access to their phones, and were told to expect some emails. A word of warning, however—these were very simple tasks like determining if a particular colored rectangle on a computer screen had moved. This was not calculus homework. Also, 85% of the high school students performed worse while multitasking, even on these simple assignments (Reddy, 2014b).

There is limited evidence suggesting that some people can get better at multitasking with practice. They can become more efficient multitaskers (Dux et al., 2009). That is not surprising, considering practice generally improves performance. But will they be more effective on the multiple tasks they are trying to accomplish? Unlikely. While they are multitasking, they will be less successful encoding information into memory. So the benefits of practice will be outweighed by the loss of encoded information (Judd, 2013).

Beware of Either/Or

Can we multitask effectively? Research at the Brain, Cognition, and Actions Laboratory at the University of Michigan says *it depends* (Hamilton, 2009). The content of the tasks makes a difference. Some tasks, such as walking and chewing gum, call on different cognitive and physical resources, and both walking and chewing are pretty automatic. But other complex tasks, such as driving and talking on the phone, require some of the same cognitive resources—paying attention to traffic and paying attention to what the caller is saying. The problem with multitasking comes with trying to do complex tasks simultaneously (Hamilton, 2009). So especially with driving, focus is critical. Remember, about nine people die every day because of distracted driving. Even supertaskers shouldn't take a chance with their lives or the lives of other people. For some great tips on how to get more done without the problems of multitasking, check out https://blog.rescuetime.com/multitasking.

ATTENTION AND TEACHING. The first step in conscious learning is paying attention. Students cannot process information that they do not perceive (Willingham, 2009). But how successfully information is processed depends on several things, not just attention. Some tasks are *resource limited*. Performance on those tasks will improve if we allocate more resources—for example, turn off the phone and give the complicated lecture your full attention. Other tasks are *data limited*, which means that successful processing depends on the amount and quality of the data available. If the quality of the information available is inadequate, then no matter how hard we focus attention, we will not be successful. For example, if you just can't hear the lecture or if you know very few of the terms being used, more focused attention will not help you understand. Think about some of Elizabeth's students, who might not know the meaning of *invert* or *numerator*. More focused attention won't help them understand. We have already discussed a third kind of task—*automated*—that happens without much attention because we have practiced it so thoroughly—for example, the way an expert musician moves her fingers on the strings of a guitar (Bruning et al., 2011).

Connect and Extend to PRAXIS II®

Attention (I, A1)

Attention has an important place in instructional activities. What steps can a teacher take to gain and maintain student attention during instruction?

Many factors in the classroom influence student attention. Calling students by name, surprise events, intriguing questions, variety in tasks and teaching methods, and changes in voice level can all be used to *gain* attention. But then students have to *maintain* attention; they have to stay focused on the important features of the learning situation. The *Guidelines: Gaining and Maintaining Attention* offer ideas for capturing and maintaining students' attention.

GUIDELINES

Gaining and Maintaining Attention

Use signals.

Examples

1. Develop a signal that tells students to stop what they are doing and focus on you. Some teachers move to a particular spot in the room, flick the lights, tap the table, or play a chord on the class piano. Mix visual and auditory signals.
2. Avoid distracting behaviors, such as tapping a pencil while talking, that interfere with both signals and attention to learning.
3. Give short, clear directions before, not during, transitions.
4. Be playful with younger children: Use a dramatic voice, sensational hat, or clapping game (Miller, 2005).

Reach out rather than call out (S. A. Miller, 2005).

Examples

1. Walk to the child, and look into his or her eyes.
2. Speak in a firm but nonthreatening voice.
3. Use the child's name.

Make sure the purpose of the lesson or assignment is clear to students.

Examples

1. Write the goals or objectives on the board, and discuss them with students before starting. Ask students to summarize or restate the goals.
2. Explain the reasons for learning and ask students for examples of how they will apply their understanding of the material.
3. Tie the new material to previous lessons—show an outline or map of how the new topic fits with previous and upcoming material.

Incorporate variety, curiosity, and surprise.

Examples

1. Arouse curiosity with questions such as "What would happen if ...?"
2. Create shock by staging an unexpected event such as a loud argument just before a lesson on communication.
3. Alter the physical environment by changing the arrangement of the room or moving to a different setting.
4. Shift sensory channels by giving a lesson that requires students to touch, smell, or taste.
5. Use movements, gestures, and voice inflection—walk around the room, point, and speak softly and then more emphatically. (My husband has been known to jump up on his desk to make an important point in his college classes!)

Ask questions and provide frames for answering.

Examples

1. Ask students why the material is important, how they intend to study, and what strategies they will use.
2. Give students self-checking or self-editing guides that focus on common mistakes or have them work in pairs to improve each other's work—sometimes it is difficult to pay attention to your own errors.

Working Memory

Working memory
The brain system that provides temporary holding and processing of information to accomplish complex cognitive tasks such as language comprehension, learning, and reasoning; the information that you are focusing on at a given moment.

Short-term memory
Component of memory system that holds information for about 20 seconds.

Nelson Cowan defines **working memory** as "the small amount of information that can be held in mind and used in the execution of cognitive tasks, in contrast with long-term memory, which is the vast amount of information saved in one's life" (2014, p. 197). Working memory is the "workbench" of the memory system, the interface where new information is held temporarily and combined with knowledge from long-term memory to perform cognitive tasks such as solving problems or comprehending a lecture. For example, when you see ¾ ÷ ½ =?, you have to hold that problem in mind while you retrieve from long-term memory what the ÷ sign means and the mathematics facts and procedures needed to solve the problem. So working memory holds what you are thinking about and using at the moment.

A quick distinction—short-term memory is not the same as working memory, even though they have similar limitations in duration and capacity. **Short-term memory** usually means just storage, the immediate memory for new information that fades very quickly, lasting no more than 20 seconds or so. Also, early experiments suggested that the capacity of short-term memory was limited by the "*magic 7" plus or minus 2* (so between 5 and 9) separate bits of new information (Miller, 1956). In everyday life, it is common to remember a new 7-digit phone number after finding it on the Internet, as you make the call. Of course, if you have to remember the area code too, you are getting past the edge—10 digits. Now what if you have two phone calls to make in succession? Two new phone numbers (14 digits or 20 digits) probably cannot be held simultaneously, and making the first call would wipe out memory for the second phone number anyway. So short-term memory is just temporary storage. But working memory includes *both* temporary storage *and* active processing—the workbench idea again—where active mental effort is applied both to new input and to knowledge from your long-term memory.

Connect and Extend to PRAXIS II®
Memory and Instruction (II, A1)
To maximize the learning derived from instructional activities, a teacher should be aware of the characteristics of working memory. Consider the techniques or tactics a teacher can employ that complement those characteristics.

A MODEL OF WORKING MEMORY. Alan Baddeley and his colleagues are responsible for one common model of working memory that is central to our current understanding of human cognition (Baddeley, 2007; 2019; Baddeley et al., 2015). In this model, working memory is composed of at least four elements: *the central executive* that controls the limited attention and other mental resources available (the "worker"of working memory); the *phonological loop* that holds speech-based and acoustical (sound) items; the *visuo-spatial sketchpad* for items that are encoded visually, spatially, and tactilely (by touch); and the *episodic buffer* where information from the phonological loop, visuo-spatial sketchpad, and long-term memory is integrated together to create meaningful representations based on all these sources. For example, if I asked you how many windows are in your home, your central executive would focus attention on a strategy such as searching long-term memory for images of the rooms in your home, holding the images on your visual sketchpad, counting the windows by saying the numbers to yourself in your phonological loop as you mentally move from room to room, and then integrating the visual and sound information in your episodic buffer to answer the question.

The phonological loop and visuo-spatial sketchpad are short-term storage for the contents of working memory—sounds and images—so they are like the short-term memory component in earlier information processing models. The phonological loop, visuo-spatial sketchpad, and episodic buffer do some lower-level work for the central executive—holding on to, refreshing, and combining information. Baddeley also said there may be other lower-level worker/storage systems for different incoming information such as smells or tastes, but the phonological loop, visuo-spatial sketchpad, and episodic buffer are the ones we know about. Figure 8.3 shows the working memory system.

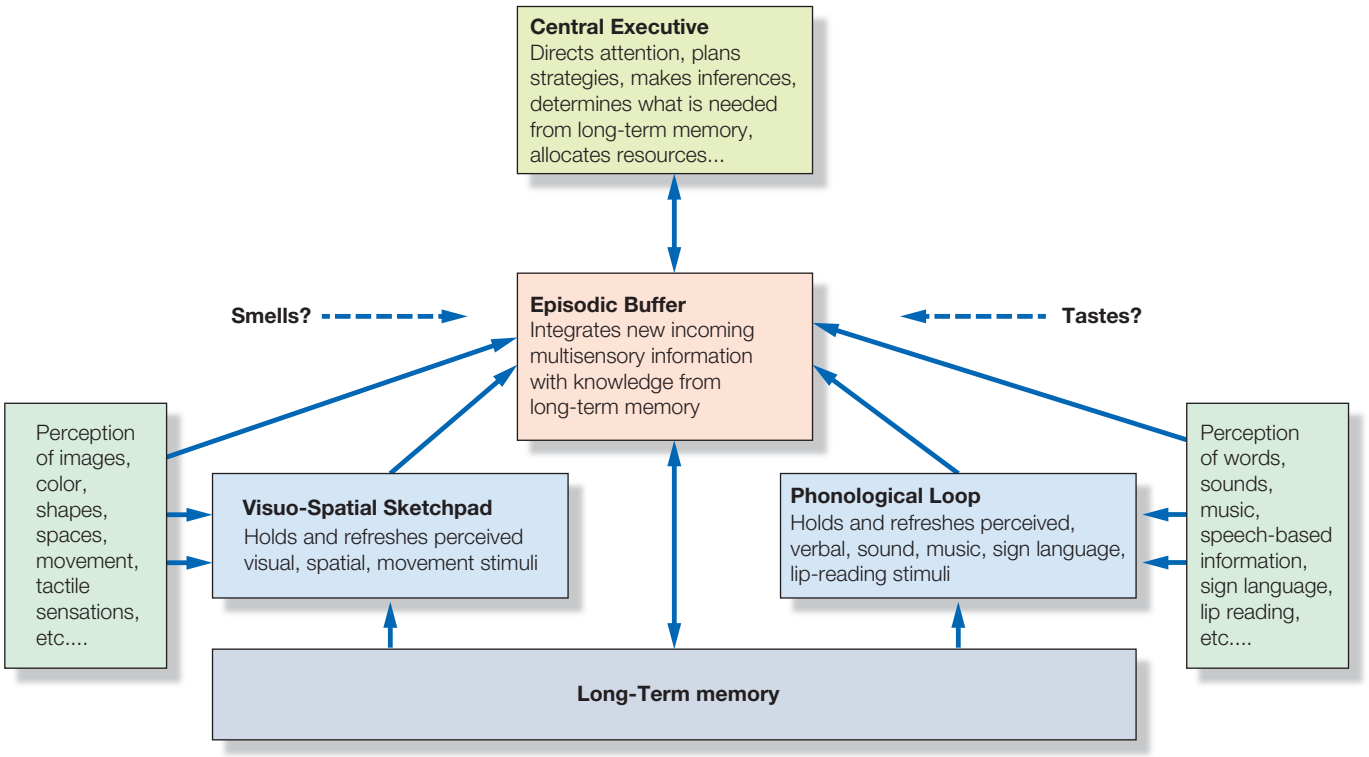
Let's investigate the parts of the working memory system in action.

Stop & Think Do some mental math to solve this problem from Radvansky and Ashcraft (2018, p. 115), and pay attention to how you go about the process:

$$\frac{(4+5)\times 2}{3+(12/4)}$$

Figure 8.3 Four Parts of Working Memory

The central executive system is the pool of mental resources for such cognitive activities as allocating and focusing attention, reasoning, and comprehension. The phonological loop holds perceived speech-based and sound information, and the visuo-spatial sketchpad holds perceived visual, spatial, and tactile information. The episodic buffer integrates information from the phonological loop, visuo-spatial sketchpad, and long-term memory. The system is limited and can be overwhelmed if there is too much information or it is too difficult.



THE CENTRAL EXECUTIVE. As you solved the problem in *Stop & Think*, the central executive of your working memory focused your attention on the facts that you needed (what is 4 + 5? what is 12/4?), retrieved from your long-term memory the rules for which operations to do first, and recalled how to divide. The **central executive** supervises attention, makes plans, draws inferences, pushes out irrelevant thoughts (yikes, this is hard!), and decides what information to retrieve and how to allocate resources, as you can see in Figure 8.3. The central executive is the heart of working memory, in charge of the other components.

Central executive
The part of working memory that is responsible for monitoring and directing attention and other mental resources.

THE PHONOLOGICAL LOOP. The **phonological loop** has two components—storage for sounds and speech-based information and a rehearsal/refresh process to keep that information active by keeping it "in the loop." The short-term storage of the phonological loop is where you put the "18" (4 + 5 = 9; 9 × 2 = 18) from the top line of the problem while you calculated the 3 + (12/4) on the bottom of the problem. Baddeley (2001, 2007) suggests that we can hold as much in the phonological loop as we can rehearse (say to ourselves) in 1.5 to 2 seconds. A 7-digit telephone number fits this limitation. But what if you tried to hold these 7 words in mind: *disentangle appropriation gossamer anti-intellectual preventative foreclosure documentation* (Gray, 2011)? Besides being a mouthful, these words take longer than 2 seconds to rehearse, so they are more difficult to hold in working memory than 7 single digits or 7 short words. In addition, some of the words may be unfamiliar to you, which makes them harder to say to yourself. The phonological loop also can hold music and other environmental sounds as well as information from sign language and lip reading (Baddeley, 2019).

Phonological loop
Part of working memory. A speech- and sound-related system for holding and rehearsing (refreshing) words and sounds in short-term memory for about 1.5 to 2 seconds.

Remember—put in your working memory—that we are discussing temporarily holding new information. In daily life, we certainly can hold more than 5 to 9 bits or 1.5 seconds of information at once. While you are entering that 7-digit phone number you just looked up, you are bound to have other things "on your mind"—in your memory—the person you are calling and why. You don't have to pay attention to these things; they are not new knowledge. Some of the processes, such as using the touchpad on the phone, are *automated* tasks. However, because of the working memory's limitations, if you were in a foreign country and were attempting to use an unfamiliar telephone system, you might very well have trouble remembering the phone number because your central executive was searching for strategies to use the phone system at the same time.

THE VISUO-SPATIAL SKETCHPAD. Now try the problem shown in the next *Stop & Think.*

Stop & Think If you rotate a *d* 180 degrees clockwise, do you get a *b* or a *p*?

Visuo-spatial sketchpad
Part of working memory. A holding system for visual, tactile, and spatial information.

Most people answer this question by creating a visual image of a *d* and rotating it. The **visuo-spatial sketchpad** is the place in your mind where you manipulated the image (after your central executive retrieved the meaning of "180 degrees," and "clockwise," of course). You can use your phonological loop and your visuo-spatial sketchpad at the same time, but each is quickly filled and easily overburdened. Each kind of task—verbal and visual—appears to happen in different areas of the brain, and there are some individual differences in the capacities of these systems, too. For example, some people might be able to hold only one visual item in memory while another can hold up to 7 items, and yet another person may hold on to a visual image by coding it verbally as "it looks like a star" or "circle." The sketchpad also can hold tactile and movement information (Baddeley, 2019; Gray, 2011; Pearson & Keogh, 2019).

Episodic buffer
The process that brings together and integrates information from the phonological loop, visuo-spatial sketchpad, and long-term memory under the supervision of the central executive.

THE EPISODIC BUFFER. Working memory is the workbench of memory, and the episodic buffer is working memory's workbench. The **episodic buffer** is a storage system that can hold about four chunks of information as it brings together and integrates information from the phonological loop, visuo-spatial sketchpad, and long-term memory under the supervision of the central executive. This integration of multisensory information allows us to create complex memories, such as storing the appearance, voice, words, and actions of an actor in a film to create a complete character or integrating visual and verbal information to determine the number of windows in your home.

CAPACITY OF WORKING MEMORY. Unlike sensory memory or long-term memory, working memory capacity is very limited—something many of your professors seem to forget as they race through a lecture while you labor to make sense of their words and PowerPoints. As you have seen, working memory, like short-term memory, is limited to about 5 to 7 bits of new information or what you can repeat to yourself in 1.5 to 2 seconds. Later in this cluster, we will discuss strategies such as chunking or grouping that can help you hold on to more information, but without applying strategies, the amount of information working memory can hold is severely limited.

Working memory capacity is really important in teaching. First, new information has to be processed by working memory before it can be stored in long-term memory, but (as I keep saying) working memory is *capacity and duration limited* (Sweller et al., 2019). Second, working memory capacity is related to academic achievement in reading, mathematics, and multimedia learning, as we will see later (Anmarkrud et al., 2019).

THE DURATION AND CONTENTS OF WORKING MEMORY. The duration of information in the working memory system is short, no more than 20 seconds, unless you keep rehearsing the information or process it in some other way (Baddeley, 2001). It may seem to you that a memory system with a 20-second time limit is not very useful, but without this system, you would have already forgotten what you read in the first part of this sentence before you

came to these last few words. This would clearly make understanding sentences difficult. Even more important, without working memory, particularly the phonological loop, learning language would be a real problem (Baddeley et al., 2015).

The contents of information in working memory may be in the form of sounds and images that resemble the representations in sensory memory, or the information may be structured more abstractly, based on meaning.

Cognitive Load and Retaining Information in Working Memory

Cognitive load is a term that refers to the amount of mental resources, mostly working memory, required to perform a particular task. The concept is really important for teachers because the central idea of cognitive load theory is that "human cognitive architecture—especially the limitations of working memory—should be taken into account when designing instruction" (Leppink et al., 2014, p. 32). This brings us back to that professor who raced through a lecture, taxing your working memory. Guess the professor didn't understand cognitive load theory. Some tasks make more demands than others on working memory—cognitive load becomes cognitive *overload*.

Cognitive load
The volume of cognitive resources necessary to complete a task.

TWO (OR THREE) KINDS OF COGNITIVE LOAD. The cognitive load of a task is not an absolute "weight." The actual cognitive load in a given situation depends on many things, including the complexity of the task, what the person already knows about it, and what instructional supports are available (Sweller et al., 2019). There are different kinds cognitive load, but two are especially critical for teaching. One is unavoidable, and the other gets in the way.

Intrinsic cognitive load is unavoidable and productive—it is the amount of cognitive processing required to figure out the material. That amount depends on how many elements you have to take into account at one time (charts, graphs, text, lecture, PowerPoints, pictures, web information . . .), how complicated the interactions among the elements are, and your level of expertise in the subject (Leppink et al., 2014). Even though working memory can hold 5 to 9 new bits of information, it can *work with* only about 2 to 4 at a time, so if you have to understand the way many separate elements interact in a complex system, such as grasping the structure and function of DNA by reading text and looking at graphs, you will be in trouble unless you already understand some of the parts: vocabulary, concepts, procedures, and so on (van Merriënboer & Sweller, 2005). Intrinsic cognitive load is unavoidable and essential—but good instruction can help manage it.

Intrinsic cognitive load
The resources required by the task itself, regardless of other stimuli.

Extraneous cognitive load is the cognitive capacity you use to deal with problems that don't help you learn, like fumbling toward an answer using trial and error without any real guidance, or trying to get your roommate (spouse, children, partner) to quit interrupting you, or struggling with a disorganized lecture or a poorly written textbook. Extraneous load is unproductive—it just depletes your working memory resources without helping you learn (Choi et al., 2015; Tricot & Sweller, 2014). The two kinds of cognitive load are summarized in Table 8.1 on the next page.

Extraneous cognitive load
The resources required to process stimuli irrelevant to the task.

Some educational psychologists talk about a third factor, *germane cognitive load* or *germane resources*, that redistributes your working memory resources away from extraneous activities and toward activities that help you learn. Motivation and self-regulation are involved in redistributing your working memory toward learning—we discuss these critical topics in Clusters 11 and 12.

COGNITIVE LOAD: LESSONS FOR TEACHERS. The goal of good instructional design and good teaching is to *manage* intrinsic load (keep complexity and difficulty just right—in the students' zone of proximal development), *reduce* extraneous load (clear away as many distractions and unnecessary complications as possible), and *optimize* germane resources that support learning by focusing working memory on the task at hand (Sweller et al., 2019).

Table 8.1 Two Kinds of Cognitive Load

There are two types of cognitive load that make demands during learning, with different causes and effects.

TYPE OF COGNITIVE LOAD	WHAT IS IT?	WHAT CAUSES IT?	WHAT'S AN EXAMPLE?	MANAGING
Intrinsic	*Unavoidable:* the essential processing needed to attend to and make sense of the material	Caused by the inherent complexity of the task (how many elements and interactions). Also affected by student's relevant knowledge or lack of knowledge.	More processing needed for novices to recognize and organize a complicated task such as quadratic equations	Be sure task fits students' abilities and current knowledge; focus attention on main ideas; review often; give multiple examples including worked-out examples
Extraneous	*Avoidable or manageable:* unhelpful processing needed to deal with problems that are not related to the learning task itself	Caused by poor learning strategies, divided attention and distractibility, poor instruction, inadequate background knowledge	Students scan back and forth between the text and a graph, but don't know how to read the graph or integrate the visual and verbal information	Remove distractions; teach key vocabulary/ concepts needed; have students explain to each other; teach and practice appropriate learning strategies

Source: Based on Bruning, R. H., Schraw, G. J., & Norby, M. M. (2011). *Cognitive psychology and instruction* (5th ed.). Boston, MA: Pearson, Mayer, R. E. (2011). *Applying the science of learning.* Boston, MA: Pearson.

For example, teachers can sequence skills from simple to complex so students first practice simple versions of the task then move to more and more complex versions, provide worked-out examples, have students complete a partially finished problem or computer program, focus attention on the main ideas, and generally supply scaffolding (see Cluster 3). If students are working with physical representations or models, focus their attention on key elements so the students don't get distracted by *seductive details*—interesting but irrelevant features of the model such as striking colors or patterns (I see a cat face there!). Give instructions orally for working with the model using pointing and gestures to focus attention. You also might have students explain the material to each other or to themselves, draw or chart their understandings, take useful notes, and apply other strategies we will discuss in upcoming clusters (Guo et al., 2020; Mavilidi & Zhong, 2019; van Gog et al., 2010).

RETAINING INFORMATION IN WORKING MEMORY. Information in working memory must be kept activated in order for it to be retrieved easily. Activation is high as long as you are focusing on information, but activation decays or fades quickly when attention shifts away. Holding information in working memory is like a circus performer keeping a series of plates spinning on top of several poles. The performer gets one plate spinning, moves to the next plate and the next, but has to return to the first plate before it slows down too much and falls off its pole. If we don't keep the information "spinning" in working memory—keep it activated—it will "fall off" (Anderson, 2020). When activation fades, forgetting follows.

Maintenance rehearsal
Keeping information in working memory by repeating it to yourself.

To keep information activated, most people continue rehearsing the information mentally. There are two types of rehearsal. **Maintenance rehearsal** involves repeating the information in your phonological loop or refreshing information in your visuo-spatial sketchpad. As long as you revisit (repeat, reimage) the information, it can be maintained in working

memory. Maintenance rehearsal is useful for retaining something you plan to use and then forget, such as a phone number or a location on a map.

Elaborative rehearsal involves connecting the information you are trying to remember with something you already know—with knowledge from long-term memory. For example, if you meet someone at a party whose name is the same as your brother's, you don't have to repeat the name to keep it in memory; you just have to make the connection. This kind of rehearsal not only retains information in working memory but also helps create long-term memories. Rehearsal is a process the central executive controls to manage the flow of information in the information processing system (Radvansky & Ashcraft, 2018).

Elaborative rehearsal
Keeping information in working memory by associating it with something else you already know.

LEVELS OF PROCESSING THEORY. Craik and Lockhart (1972) first proposed their **levels of processing theory** (sometimes called *depth of processing theory*) as an alternative to short-/long-term memory models, but levels of processing theory is particularly related to the notion of elaborative rehearsal. Craik and Lockhart suggested that the length of time that information is remembered is determined by the extent to which the information is analyzed and connected with other information. The more completely and deeply information is processed, the better are our chances of remembering it. For example, according to the levels of processing theory, if I ask you to sort pictures of dogs based on the color of their coats, you might not remember many of the pictures later. But if I ask you to rate each dog on how likely it is to chase you as you jog, you probably would remember more of the pictures. To rate the dogs, you must pay attention to details in the pictures, relate features of the dogs to characteristics associated with danger, remember your experiences with dogs, and so on. This rating procedure requires elaborative rehearsal (associating the information with what you already know), so processing is deeper and more focused on the *meaning* of the photos, not the surface features like color. It does make sense that we will learn and remember more when we apply some effort and good strategies, rather than when we just skim the surface (Brown et al., 2014; Catrysse et al., 2018; Craik, 2020).

Levels of processing theory
Theory that recall of information is based on how deeply it is processed.

The limited capacity of working memory can also be somewhat circumvented by the process of **chunking**. Because the number of bits of information, not the size of each bit, is a limitation for working memory, you can retain more information if you can group individual bits of information. You can experience this effect of chunking by trying to hold these letters in memory:

HBOUSACIALOLATM

Now try these:

HBO USA CIA LOL ATM

You just used chunking to group the string of letters into memorable (and meaningful) chunks, so you could hold more in memory. Also, you brought your knowledge of the world to bear on the memory task. Chunking helps you remember a password or social security number.

Chunking
Grouping individual bits of data into meaningful, larger units.

FORGETTING. Information may be lost from working memory through *interference* or *decay*. **Interference** is fairly straightforward: Processing new information interferes or gets confused with old information. As new thoughts accumulate, old information is lost from working memory. Information is also lost by time **decay**. If you don't continue to pay attention to information, the activation level decays (weakens) and finally drops so low that the information cannot be reactivated—it disappears altogether. Some new research, however, suggests there is a kind of memory that seems forgotten but is really just "on hold"—neural traces of recent memories that are "asleep" but might be awakened with the right stimulation (Pinker, 2017; Rose et al., 2016).

Interference
The process that occurs when remembering certain information is hampered by the presence of other information.

Decay
The weakening and fading of memories with the passage of time.

Actually, forgetting is very useful. Without forgetting, people would quickly overload their working memories, and learning would cease. Also, it would be a problem if you remembered permanently every sentence you ever read, every sound you ever heard, every picture you ever saw . . . you get the idea. Finding a particular bit of information in all that sea of knowledge would be impossible. It is helpful to have a system that provides temporary storage and that "weeds out" some information from everything you experience (Popov et al., 2019).

Individual Differences in Working Memory

Working memory capacity is a good predictor of a range of cognitive skills including language understanding, reading and mathematics abilities, and fluid intelligence. As you might expect, there are both developmental and individual differences in working memory.

DEVELOPMENTAL DIFFERENCES. All of the components of working memory are in place by about age 4. Performance on working memory tasks improves steadily over the elementary and secondary school years, but visual/spatial memory appears to develop earlier. Three basic aspects of memory improve over time: memory span or the amount of information that can be held in working memory, memory processing efficiency, and speed of processing. These three basic capacities act together and influence each other; more efficient processing allows greater amounts to be held in memory, for example (Demetriou et al., 2002).

One reason younger children remember less than older children is that younger children rely more on verbatim encoding than on gist or meaning encoding. Everyone forgets verbatim information more quickly. Young children may rely on verbatim encoding because they have fewer strategies and less knowledge to use for encoding the meaning. But as they grow older, children have more knowledge and develop more effective strategies for remembering information. You experienced the power of knowledge and strategies when you remembered HBOUSACIALOLATM by using your knowledge to chunk the letters into HBO USA CIA LOL ATM.

Most children spontaneously discover rehearsal around age 5 or 6 and continue to use this strategy for verbatim remembering. Around age 6, most children discover the value of using organizational strategies, and by 9 or 10, they use these strategies spontaneously. So, given the following words to learn:

couch, orange, rat, lamp, pear, sheep, banana, rug, pineapple, horse, table, dog

an older child or an adult might organize the words into three short lists of *furniture, fruit*, and *animals*. Also remember that knowledge in an area helps you use categories to organize and remember, as we saw with the expert fourth-grade soccer players earlier. Younger children can be taught to use organization to improve memory, but they probably won't apply the strategies on their own unless they are reminded. Children also become more able to use elaboration as they mature, but this strategy develops late in childhood. Creating images or stories to assist in remembering ideas is more helpful for older elementary school students and adolescents (Siegler et al., 2020).

So, through changes in the brain, faster processing of information, the development and automating of strategies, and added knowledge, working memory increases in capacity from ages 4 through adolescence (Alloway et al., 2006; Gathercole et al., 2004). Children are 10 to 11 years old before they have adult-like memories (Bauer, 2006).

INDIVIDUAL DIFFERENCES. Now try this *Stop & Think* exercise.

Stop & Think Read the following sentences and words in caps out loud once:

For many years my family and friends have been working on the farm. SPOT

Because the room was stuffy, Bob went outside for some fresh air. TRAIL
We were fifty miles out to sea before we lost sight of the land. BAND

Now cover the three sentences and name the words that were in all caps. Who was in the stuffy room? Who worked on the farm?

You have just taken a few items from a test of working memory span (Engle, 2001). The test required you to both process and store—process the meaning of the sentences and store the words. How did you do?

The more educational psychologists study working memory, the more we realize how important it is in learning and development at every age (Alloway et al., 2010; Welsh et al., 2010). For young children, growth in working memory and attention control during the preschool years predicts emergent literacy and number skills. For elementary school students, growth in working memory (but not simple short-term memory) is related to reading abilities and reading comprehension; problems with working memory are associated with reading disabilities. For adolescents and adults, the correlation between scores on a test of working memory span (like the one you just took in the *Stop & Think* exercise) and the verbal portion of the Scholastic Assessment Test (SAT) is about .59. But there is no correlation between the SAT and simple short-term memory span (repeating digits). Individual differences in working memory are related to measures of fluid intelligence and giftedness in math and language, as well as to academic achievement in math, reading, written language, second language learning, programming, taking notes, and following complex instructions. Correlations range from .3 to .9 depending on the study (Baddeley et al., 2015; Fenesi et al., 2015). But beware: Working memory performance can vary across the school day and week, so your students can have good days and bad days for learning (Dirk & Schmiedek, 2016).

Is Working Memory Really Separate?

Some psychologists have suggested that working and long-term memory are not two separate memory stores. Rather, working memory is the current "focus of attention" in long-term memory (Cowan, 2008, 2014; Fenesi et al., 2015). The difference between working memory and long-term memory may be whether a particular memory is currently being used or is "activated." Whether working memory is separate from or a part of long-term memory, it is clear that forming and finding long-term memories is a key to learning. Because this is such an important topic for teachers, we will spend quite a bit of time on it.

Module 25 Summary

Elements of the Cognitive Perspective (pp. 330–332)

What is the brain's role in cognition? The human brain is made up of many different modules with specialized functions. All these modules work together to make sense of your ongoing experiences and to learn. Connections among neurons throughout the brain are always changing in response to experiences and this change, this neural plasticity, is the basis for memory. For example, individuals who regularly complete tasks such as taxi driving develop certain regions of the brain more than others who do not engage in such activities. Because of the continuing development of the brain, particularly as the prefrontal cortex matures, children begin to engage in complex tasks such as integrating past and present experiences by approximately age 7 or 8.

How does knowledge affect learning? The cognitive approach suggests that one of the most important elements in the learning process is knowledge the individual brings to the learning situation. What we already know determines to a great extent what we will pay attention to,

perceive, learn, remember, and forget. Knowledge is categorized as domain-specific (tied to a particular subject) or general and also as declarative, procedural, or self-regulatory. Declarative knowledge is knowledge that can be declared, usually in words or other symbols. Declarative knowledge is "knowing that" something is the case. Procedural knowledge is "knowing how" to do something; it must be demonstrated. Self-regulatory knowledge is "knowing when and why" to apply your declarative and procedural knowledge.

Cognitive Views of Memory (pp. 332–347)

Describe the path from sensory input to recognizing objects. The capacity of sensory memory is great but the duration that this input stays in sensory memory is short—about 3 seconds. In this brief time, the first phase in the process of recognizing objects is feature analysis, or bottom-up processing, because the stimulus must be analyzed into features or components and assembled into a meaningful pattern. The Gestalt principles are one explanation for how features are organized into patterns. In addition to noting features and using these Gestalt principles, to recognize patterns rapidly, we use what we already know about the situation, information from the context, and our knowledge of prototypes or best examples.

What role does attention play? Attention can be stimulus-driven (something just "grabs" your attention) or goal-driven (you intentionally focus your attention). What we pay attention to is guided to a certain extent by what we already know and what we need to know, so attention is involved in and influenced by all three memory processes shown in Figure 8.1. What takes more attention in the beginning can become more automatic with practice. Some people believe that they can divide their attention, between texting and driving, for example, but research shows that very few people are good multitaskers. Some students have difficulties controlling their attention, but teachers must work at gaining and holding everyone's attention for learning.

What is working memory? Working memory is what you are thinking about at the moment, but it is *capacity and duration limited*. Working memory is both short-term storage in the phonological loop and visuo-spatial sketchpad and processing in the episodic buffer, guided by the central executive—it is the workbench of conscious thought. The capacity of working memory is limited to about 5 to 7 bits of new information or what you can repeat to yourself in 1.5 to 2 seconds. The duration of information is about 20 seconds. The contents of information in working memory may be in the form of sounds and images that resemble the representations in sensory memory, or the information may be structured more abstractly, based on meaning.

What is cognitive load, and how does it impact information processing? *Cognitive load* refers to the volume of cognitive resources, including perception, attention and memory, necessary to perform a task. These resources must be devoted not only to organizing and understanding the task, but also to analyzing the solution and ignoring irrelevant stimuli. The resources used to do the task are called *intrinsic cognitive load*—these efforts are necessary and productive. The resources devoted to irrelevant activities that don't help you learn are called *extraneous cognitive load*—unproductive and distracting. If cognitive load is high, it can decrease or even inhibit one's ability to perform a task. The goal of good instructional design and good teaching is to *manage* intrinsic load (keep it just right for the students' abilities—in their zone of proximal development) and *reduce* extraneous load (clear away as much as possible).

How can you retain information in working memory? To keep information activated in working memory longer than 20 seconds, people use maintenance rehearsal (mentally repeating) and elaborative rehearsal (making connections with knowledge from long-term memory). Elaborative rehearsal also helps move new information to long-term memory. The limited capacity of working memory can also be somewhat circumvented by chunking. There are individual and developmental differences in working memory, and working memory span is related to performance on tasks that require higher-level thinking and controlled attention such as IQ tests and the SAT. Recently, some psychologists have suggested that working and long-term memory are not two separate memory stores. Rather, working memory is the part of long-term memory that works on (processes) currently activated information.

MODULE 26 Understanding Long-Term Memory

Learning Objective 8.3 Describe current views of long-term memory, particularly the contents and types of long-term memory, individual differences, and the processes of retrieving information from long-term memory.

Long-Term Memory

Working memory holds the information that is currently activated—"on your mind," such as the name of the person you just met. **Long-term memory** holds the information that is well learned, such as the names of all the people you know.

Long-term memory
Permanent store of knowledge.

Capacity and Duration of Long-Term Memory

There are a number of differences between working and long-term memory. Information enters working memory very quickly, but it takes time and effort to store memories for the long term. The *capacity* of working memory is limited, but the capacity of long-term memory appears to be, for all practical purposes, unlimited. And once information is securely stored in long-term memory, its *duration* there can be permanent—it can be stored forever under the right conditions. Our access to information in working memory is immediate because we are thinking about the information at that very moment. But gaining access to information in long-term memory can require time and effort, as you know when you struggle to remember a name before that person walking across the room reaches you.

Most cognitive psychologists believe there are that two kinds of long-term memory—explicit and implicit—with subdivisions under each category. **Explicit memory** is knowledge from long-term memory that can be recalled, consciously considered, and declared—basically declarative knowledge, as we defined earlier in the cluster (you remember that, right?). For that reason, explicit memory is sometimes called *declarative memory*. We are aware of these memories; we know we have remembered them. The hippocampus in the brain is particularly important for forming explicit memories. **Implicit memory**, on the other hand, is knowledge that we are not conscious of recalling, but that influences behavior or thought without our awareness. These different kinds of memory make up the *contents* of long-term memory and are associated with different parts of the brain (Radvansky & Ashcraft, 2018).

Explicit memory
Long-term memories that involve deliberate or conscious recall.

Implicit memory
Knowledge that we are not conscious of recalling but that influences our behavior or thought without our awareness.

Contents of Long-Term Memory: Explicit (Declarative) Memories

Explicit memories are what we usually consider to be knowledge of the world—the things that we know that we know. Explicit (declarative) memories can be either *semantic* (based on meaning) or *episodic* (based on the sequence of events, such as memory for your own experiences).

Semantic memory, very important in schools, is memory for *meaning*, including words, facts, theories, and concepts. But semantic memories also include attributes such as the color of lemons or the taste of apples and general knowledge such as how to get a good seat at a concert or avoid being called on in class (Baddeley et al., 2015). Sematic memories are not tied to particular experiences and are represented and stored as *propositions*, *images*, *concepts*, and *schemas* (Anderson, 2020).

Semantic memory
Memory for meaning.

PROPOSITIONS AND PROPOSITIONAL NETWORKS. How do we represent the meaning of sentences and pictures in our memories? One answer is with propositions connected in networks. A proposition is the smallest unit of knowledge that can be judged true or false. John Anderson (2020, pp. 145–146) gives this example of a statement with three propositions: "Lincoln, who was

president of the United States during a bitter war, freed the slaves." The three basic propositions are:

1. Lincoln was president of the United States during a war.
2. The war was bitter.
3. Lincoln freed the slaves.

Propositional network
Set of interconnected concepts and relationships in which long-term knowledge is held.

Propositions that share information are linked in what cognitive psychologists call **propositional networks**. It is the meaning, not the exact words or word order, that is stored in the network. The same propositional network would apply to the sentence: "The slaves were freed by Lincoln, who, during a bitter war, was president of the United States." The meaning is the same, and it is this meaning that is stored in memory as a set of relationships among propositions.

It is possible that most information is stored and represented in propositional networks. When we want to recall a bit of information, we can translate its meaning (as represented in the propositional network) into familiar phrases and sentences, or mental pictures. Also, because propositions are networked, the recall of one bit of information can trigger or activate recall of another. We are not aware of these networks because they are not part of our conscious memory (Anderson, 2020). In much the same way, we are not aware of underlying grammatical structure when we form a sentence in our own language; we don't have to label parts of speech to be able to speak.

Images
Representations based on the physical attributes—the appearance—of information.

IMAGES. **Images** are representations based on the structure or appearance of the information. As we form images (like you did in the rotating *d* problem), we try to remember or recreate the physical attributes and spatial structure of information. For example, when asked what store is beside the Starbucks at a particular intersection in town, many people would use "their mind's eye" to view the intersection and then "look" beside the Starbucks. However, researchers don't agree on exactly how images are stored in memory. Some psychologists believe that images are stored as pictures; others believe we store propositions in long-term memory ("Target is beside Starbucks") and convert to pictures in working memory when necessary. The debate continues (Sternberg & Sternberg, 2012).

Dual coding theory
Suggests that information is stored in long-term memory as either visual images or verbal units, or both.

Features of each process probably are involved—some memory for images and some verbal descriptions of the image. Seeing images "in your mind's eye" is not exactly the same as seeing the actual image. It is more difficult to perform complicated transformations on mental images than it is on real images. For example, if you had a plastic *d* magnet on your refrigerator, you could very quickly rotate it. Rotating mentally takes more time for most people. And it is easier to form images for some words or concepts than others. It is probably easier for you to form an image of *Starbucks* than one of *justice,* for example. Nevertheless, images are useful in making many practical decisions such as how a sofa might look in your living room or how to line up a golf shot. Images may also be helpful in abstract reasoning. Physicists such as Faraday, Feynman, and Einstein reported creating images to reason about complex new problems. Einstein claimed that he was visualizing chasing a beam of light and catching up to it when the concept of relativity came to him (Isaacson, 2007; Kosslyn & Koenig, 1992).

TWO ARE BETTER THAN ONE: WORDS AND IMAGES. Allan Paivio's (1986, 2006; Clark & Paivio, 1991) **dual coding theory** suggests that information is stored in long-term memory as either visual images or verbal units, or both, and information coded both visually and verbally is easiest to learn (Butcher, 2006). This may be one reason why explaining an idea with words and then representing it visually in a figure, as we do in textbooks, has proved helpful to students (Eitel & Scheiter, 2015; Schnotz & Wagner, 2018). Also, when young students are learning vocabulary in a second language, accompanying those words with pictures or gestures helps students learn and remember the new vocabulary (Andrä et al., 2020). For teaching most subjects, gestures that match the meaning of the words, like moving both fists up and down to talk about "pumping," are the most effective (Dargue & Sweller, 2020).

Stop & Think What makes a cup a cup? List the characteristics of *cupness*. What is a fruit? Is a banana a fruit? Is a tomato a fruit? How about a squash? A watermelon? A sweet potato? An olive? A coconut? How did you learn what makes a fruit a fruit?

CONCEPTS. Most of what we know about cups and fruits and the world in general involves concepts and relations among concepts (Eysenck, 2012; Radvansky & Ashcraft, 2018). But what exactly is a concept? A **concept** is a mental representation used to group similar events, ideas, objects, or people into a category. When we talk about a particular concept such as *student*, we refer to our mental representation of a category of people who are similar to one another: they all study a subject. The people may be old or young, in school or not; they may be studying basketball or Bach, but they all can be categorized as students. Concepts are abstractions. They do not exist in the real world. Only individual examples of concepts exist. Concepts help us organize vast amounts of information into manageable units. For instance, there are about 7.5 million distinguishable differences in colors. By mentally categorizing these colors into some dozen or so groups, we manage to deal with this diversity quite well (Bruner, 1973).

In early research, psychologists assumed that people create concepts based on rules about **defining attributes**, or distinctive features. Your concept of a cat might include defining attributes such as a round head on a small body, triangle-shaped ears, whiskers, four legs, and fur. This concept enables you to identify cats whether they are calico or Siamese without relearning "cat" each time you encounter a new cat. The defining attributes theory of concepts suggests that we recognize specific examples by noting key required features.

Since about 1970, however, these views about the nature of concepts have been challenged (Radvansky & Ashcraft, 2018). Although some concepts, such as *equilateral triangle*, have clear-cut defining attributes, most concepts do not. Take the concept of *party*. What are the defining attributes? You might have difficulty listing these attributes, but you probably recognize a party when you see or hear one (unless, of course, we are talking about political parties or the other party in a lawsuit). What about the concept of *bird*? Your first thought might be that birds are animals that fly. But is an ostrich a bird? What about a penguin? A bat?

PROTOTYPES, EXEMPLARS, AND THEORY-BASED CATEGORIES. One current view of concept learning suggests that we have in our minds a prototype of a party or a bird or the letter *A*—an image that captures the essence of each concept. A **prototype** is the best representative of its category—an example that has the most important "core" features of the category. For instance, the best representative of the "birds" category for many North Americans might be a robin (Rosch, 1973). Other members of the category may be very similar to the prototype (sparrow) or similar in some ways but different in others (chicken, ostrich). At the boundaries of a category, it may be difficult to determine if a particular instance really belongs. For example, is a television "furniture"? Is an elevator a "vehicle"? Is an olive a "fruit"? Whether something fits into a category is a matter of degree or graded membership. Thus, categories have fuzzy boundaries. Some events, objects, or ideas are simply better examples of a concept than others (Eysenck, 2012; Radvansky & Ashcraft, 2018).

Another explanation of concept learning suggests that we identify members of a category by referring to exemplars. **Exemplars** are our actual memories of specific birds, parties, furniture, and so on that we use to compare with an item in question to see if that item belongs in the same category as our exemplar. Prototypes probably are built from experiences with many exemplars. This happens naturally because memories of particular events (episodic memories) tend to blur together over time, creating for example, an average or typical sofa *prototype* from all the sofa *exemplars* you have experienced (Smith & Kosslyn, 2007).

There are some drawbacks to prototype and exemplar theories. For example, how do you know which "bird experiences" to blur or average together to create a bird concept if you don't already have a bird concept? One answer is that our classifications are essentially **theory-based** ideas about the world that we create to make sense of things. So a *brick*, a *rock*, and a *shoe* are in the same category if the category is "things to pound a

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Teaching Concepts (II, A2)

Teachers devote much effort to the development of concepts that are vital in learning subject matter and skills. Understand the major approaches to teaching concepts and be able to describe their strengths and limitations.

Concept

A category used to group similar events, ideas, objects, or people.

Defining attribute

Qualities that connect members of a group to a specific concept.

Prototype

A best example or best representative of a category.

Exemplar

An actual memory of a specific object.

Theory-based

An explanation for concept formation that suggests our classifications are based on ideas about the world that we create to make sense of things.

Table 8.2 Teaching the Concept of "Chair"

Here are key elements to use in teaching about chairs

TEACHING STEP	EXAMPLE
Name concept	Chair
Define concept	Seat with a back for one person
Describe relevant (defining) attributes	Seat, back
Describe irrelevant attributes	Legs, size, color, material, design
Give examples	Easy chair, dining table chair, recliner, beanbag chair, high chair, desk chair (fuzzy examples: airplane seat? Movie seat?)
Give nonexamples	Bench, stool, table, sofa

Source: Based on Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.). Boston, MA: Allyn & Bacon/Pearson, p. 272.

nail with if I don't have a hammer." Our theory of what might work creates the "things to pound with" category. Some of the knowledge used to create concepts based on theories may be implicit and out-of-awareness, for example, what makes for "good music"—I just know it when I hear it (Radvansky & Ashcraft, 2018; Sternberg & Sternberg, 2012).

TEACHING CONCEPTS. In teaching concepts, provide the name of the concept and a definition, but don't stop there. Students also need a description of relevant and irrelevant attributes as well as examples and nonexamples. They need guidance in finding the "fuzzy edges" of the concept. Make sure some examples are *prototypes*—the most obvious members of the concept category (robin or sparrow for *birds*; apple or orange for *fruit*). Also include examples near the fuzzy edges (ostrich or penguin for *birds*; olive or tomato for *fruit*). Present both concrete and abstract examples, such as using manipulatives in math to solve word problems, then connecting the answers found using these concrete materials to abstract numbers and formulas that also solve the problem. Point out how the specific relates to the abstract (Pashler et al., 2007). See Table 8.2 for a summary of how to teach the concept of "chair." Of course, this is not the "chair" of a department or an endowed "chair" professorship or "chairing" a meeting—even seemingly simple concepts can be confusing if your first language is not English.

Providing good explanations and examples is especially important in concept learning (Zamary & Rawson, 2018). But this is not always easy for teachers, especially if the concepts are complicated and the teachers are creating examples "on the fly." Let's step back into Elizabeth's lesson on division of fractions (Woolfolk, 1993). Remember, Elizabeth had just solved ¾ ÷ ½ =? by applying the rule "invert and multiply." Then disaster hit:

> Aliyah asked, "I was just wondering *why*—why do you invert and then multiply."
>
> Elizabeth gallantly attempted to draw pictures to explain. On the board she sketched a wall divided into 4 panels, with one panel painted and ¾ of the wall left unpainted. She explained, "You only have enough paint to do half of the ¾, so how much can you paint?" She tries to draw that situation but then realizes she has just given an example of *multiplication*: ½ *of* ¾, which you probably remember means ½ *multiplied by* ¾.

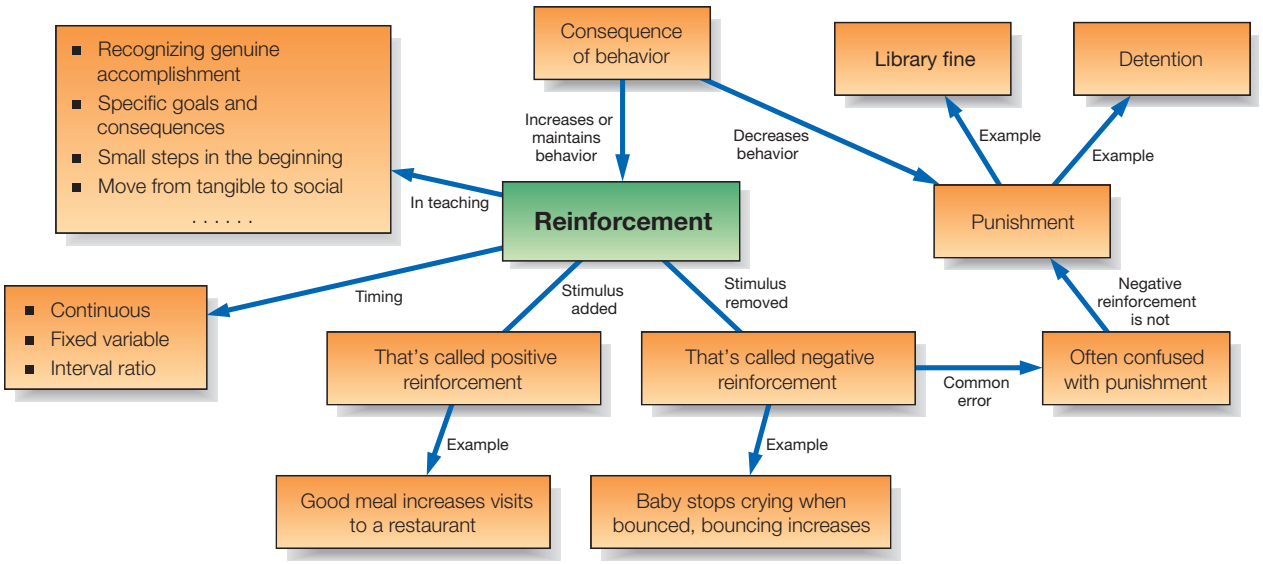
The moral of this story is anticipate students will ask why and have explanations and examples ready. To practice the concept, have students sort items into examples or nonexamples and then explain to partners why they made their choices. Also, have students integrate the concepts into larger networks of knowledge called *schemas*. Maybe that is what Aliyah was trying to do.

Schemas (singular, *schema*)
In cognitive theory, basic structures for organizing information; concepts.

SCHEMAS. Propositions, concepts, and single images are fine for representing single ideas and simple relationships, but often our knowledge about a topic combines many concepts, images, and propositions. To explain this kind of complex knowledge, psychologists developed the idea of a schema. **Schemas** (sometimes called *schemata*) are abstract knowledge structures that organize vast amounts of information. A schema (the singular form) is a mental framework that guides our perception and helps us make sense of our experience

Figure 8.4 A Partial Schema for Reinforcement

The concept of *reinforcement* is under the general category of *consequence.* It is related to other concepts such as eating in restaurants or bouncing babies, depending on the individual's experiences.



based on what we already know and what we expect to happen (Sternberg & Sternberg, 2012). Figure 8.4 is a partial representation of a schema for knowledge about reinforcement.

The schema tells you what features are typical of a category, what to expect about an object or situation. The pattern has "slots" that are filled with specific information as we apply the schema in a particular situation. And schemas are personal. For example, my schema of *reinforcement* is less richly developed than Skinner's schema must have been. You encountered a very similar concept of *schemes* (organized systems of action and thought) in the discussion of Piaget's theory of cognitive development in Cluster 3.

When you hear the sentence "Lincoln, who was president of the United States during a bitter war, freed the slaves," you know even more than the three propositions. You probably can infer that reuniting the country after the war was difficult based on your schema for a "bitter" conflict. Your schema for "slaves" gives you some sense of the kind of life they were freed from. None of this information was explicitly stated in the sentence. So even concepts that are not mentioned in a passage are important for understanding that passage—one reason why reading comprehension depends on a good store of prior knowledge (O'Reilly et al., 2019).

Schematic knowledge helps us form and understand concepts. How do we know that counterfeit money is not "real" money, even though it perfectly fits our "money" prototype and exemplars and looks like real money? We know because of its history. The "wrong" people printed the money. So our understanding of the concept of money is connected with concepts of crime, forgery, the federal treasury, and many others in a larger schema for "money."

Another type of schema, a **story grammar** (sometimes called a *schema for text* or *story structure*), helps students understand and remember stories. A specific story grammar for murder mysteries could be something like this: murder discovered, search for clues, murderer's fatal mistake identified, trap set to trick suspect into confessing, murderer takes bait . . . mystery solved! To comprehend a story, we select a schema that seems appropriate. Then we use this framework to decide which details are important, what information to seek, and what to remember. The schema guides us in "interrogating" the text, pointing to the specific information we expect to find so that the story makes sense. If we activate our "murder mystery schema," we may be alert for either clues or a murderer's fatal mistake. Without an appropriate schema, trying to understand a story, textbook, or classroom lesson is a very slow, difficult process, something like finding your way through a new town without a map or GPS. And because there are cultural differences in schemas, it is possible that students bring different schemas to reading and therefore "read" different

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Prior Knowledge (I, A1)

Prior knowledge strongly influences how we build and reorganize new knowledge. Be familiar with the role of schemas and propositional networks in the construction of knowledge and how they affect learning.

Story grammar

Typical structure or organization for a category of stories.

meanings into the same text. The meaning is not simply in the text; it is in the reader's interpretation based on the schemas he or she used to make sense of the text (Lee, 2016).

Propositions, images, concepts, and schemas are all explicit *semantic* memories. The second kind of explicit memory is *episodic*.

EPISODIC MEMORY. What is your earliest memory? If that memory is before you were about 3, then it probably is not really your memory but instead a story you constructed from looking at pictures, hearing others' descriptions, or making inferences (Akhtar et al., 2018; Wu & Jobson, 2019). Memory for information tied to a particular place and time, especially information about the events or episodes of your own life, is called **episodic memory**. Episodic memory is about events we have experienced, so we often can explain when the event happened. In contrast, we usually can't describe when we acquired a semantic memory. For example, you may have a difficult time remembering when you developed semantic memories for the meaning of the word *injustice*, but you can easily remember a time that you felt unjustly treated. Episodic memory also keeps track of the order of things, so it is a good place to store jokes, gossip, or plots from films. Sometimes we search for memories of past events, but other times, they are triggered by a smell, sight, sound, and so on (Zacks, 2020). When I was looking for a new home in Columbus, Ohio, I walked into the dirt-floor basement of an older house in German Village. Suddenly I was 5 years old again, looking for my grandmother's home-canned cherries as the smell of the damp earth flooded my thoughts (my working memory) with images of my grandparents' basement on their farm in Wisconsin.

Episodic memory
Long-term memory for information tied to a particular time and place, especially memory of the events in a person's life.

Memories for dramatic or emotional moments in your life are called **flashbulb memories**. These memories are vivid and complete, as if your brain demanded that you "record this moment." Under stress, more glucose energy goes to fuel brain activity, while stress-induced hormones signal the brain that something important is happening (Sternberg & Sternberg, 2012). So when we have intense emotional reactions, memories are stronger and more lasting. Many people have vivid memories of very positive or very negative events in school such as winning a prize or being humiliated. People over 60 have vivid memories of the day John F. Kennedy was assassinated. My whole school had walked to the main street of our suburb of Fort Worth, Texas, to applaud as his motorcade drove by en route to the airport for his flight to Dallas. When I got back to geometry class, we heard the announcement that he had been shot in Dallas. My friend from our school paper, who had been at a press breakfast with him that very morning, was devastated.

Flashbulb memories
Clear, vivid memories of emotionally important events in your life.

All episodic memories are subject to some inaccuracies as we reconstruct, make inferences, or combine bits and pieces to remember an event. There are decades of research showing that false memories can be created by such things as showing people doctored pictures of themselves enjoying an activity they never did or by asking leading questions (Gluck et al., 2020). What about your students? Often children are asked about their memories of something they witnessed. Can we rely on young children's memories in these situations? The answer appears to be "It depends." The real problem with memory accuracy occurs for young children when they are asked *suggestive questions* such as "Did the girl in the red shirt steal the bicycle?" or "Was the monkey wearing a collar or a leash?" (Bruck et al., 2002). Compared to older children and adults, young children are more likely to be influenced by leading questions and false suggestions, in part because young children have trouble with **source monitoring**—remembering where they encountered the information. Was it something they really experienced, did they see it on TV, or did the event happen to a friend, not to them (London & Ceci, 2012)? Also, when questions are suggestive, repeated, and high pressure ("The other children said yes!"), then young children are more likely to recall inaccurate memories (Finnila et al., 2003). Of course, adults also are affected by the questions asked and the way they are interviewed (Loftus & Greenspan, 2017).

Source monitoring
Deciding if a memory is real and accurate by remembering where you encountered particular information—your own experience, a dream, TV, or someone else's experience.

If you or another adult interviews one of your students, be sure that person is well qualified. The *Guidelines: Interviewing Students and Eyewitness Testimony* give just a few example recommendations for talking with young students about events in their lives.

Research on episodic memory with older students has focused on eyewitness testimony and students' suggestibility. Like young students, students in the middle years tend to be more accurate when they are interviewed in unbiased ways without suggestive questions. In addition,

GUIDELINES

Interviewing Young Students and Eyewitness Testimony

Plan the interview to make the most of the child's memory.

Examples

1. Interview the student as soon as possible after the event.
2. Have the interview in a simply furnished room with child-friendly furniture and not too many toys—these could suggest make-believe play.

Establish rapport and make children comfortable.

Examples

1. Be friendly; avoid titles like "Doctor" or "Principal."
2. Make sure the student knows it is OK to say, "I don't remember," "I don't know," or "I don't understand." Practice answering made-up questions this way. For example, ask, "What did your mother say the day you were born?"
3. Tell the student you have no information about the event and the student should just report what he or she remembers because you were not there.

Do not use suggestive techniques.

Examples

1. Avoid leading questions such as "What happened after he hit you?" Ask open-ended and free-recall questions such as "Tell me what happened yesterday on the playground" or "Is there anything else you can tell me?"
2. Be careful not to praise some answers while ignoring others. Don't promise the student a reward for talking to you.
3. Avoid repeating questions—students might think you did not believe their first answer or that you thought it was wrong.

Encourage students to monitor the source of their information.

Examples

1. Ask the student to think carefully about where the information came from.
2. Ask if the student heard from others about the event.

Respect the student's wishes.

Examples

1. If the student does not want to talk about a topic, don't press.
2. If the student wants to end the interview, say, "OK, we can talk again another time."
3. End the interview with a thank-you and then discuss something neutral such as what the student is doing after the interview.

Learn more about interviewing.

Examples

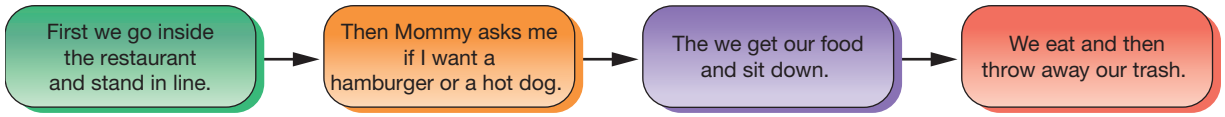
1. See http://www.ipt-forensics.com/journal/volume6/j6_3_2.htm, taken from the journal *Issues in Child Abuse Accusations*.
2. See UNICEF: Principles of Ethical Reporting on Children: https://www.unicef.org/media/reporting-guidelines.
3. Read *Investigative Interviews of Children: A Guide for Helping Professionals* by Debra A. Poole and Michael E. Lamb, published by the American Psychological Association, 2003.

older students are better than younger students at identifying the source of a memory, so they can separate what happened in a specific situation, such as a particular class trip, from what generally happens in similar situations (Bjorklund et al., 2002; Odegard & Toglia, 2013; Peterson, 2012).

Contents of Long-Term Memory: Implicit Memories

There are three kinds of implicit, or unconscious, memories: *classical conditioning*, *procedural memory*, and *priming effects*. In classical conditioning, as we saw in Cluster 7, some unconscious memories may cause you to feel anxious as you take a test or make your heart rate

Figure 8.5 A Child's Script for a Fast Food Restaurant



Procedural memory
Long-term memory for how to do things.

Script
Schema, or expected plan, for the sequence of steps in a common event such as buying groceries or ordering pizza.

Productions
The contents of procedural memory; rules about what actions to take, given certain conditions.

Connect and Extend to PRAXIS II®
Memory and Recall (I, A1)
Cognitivists emphasize the role that elaboration, organization, and context have in effective encoding of information into long-term memory. Be aware of techniques that make use of those processes.

Priming
Activating a concept in memory or the spread of activation from one concept to another.

increase when you hear a dentist's drill. **Procedural memory** is memory for skills, habits, and how to perform tasks—in other words, memory for procedural knowledge. It may take a while to learn a procedure such as how to shoot a free throw, factor an equation, or design a teaching portfolio, but once learned, this knowledge tends to be remembered for a long time. Procedural knowledge is represented as *scripts* and *productions*.

Scripts are action sequences or plans for actions stored in memory (Schraw, 2006). We all have scripts for events like ordering food in restaurants, and these scripts differ depending on whether the restaurant is a four-star bistro or a fast food drive-through. Even young children have scripts for how to behave during snack time at preschool or in a restaurant, as you can see in Figure 8.5. In fact, for very young children, scripts seem to help them organize and remember the predictable aspects of their world. This frees up some working memory to learn new things and recognize when something is out of place in the situation. In terms of human survival, it probably is useful to remember what should happen and to notice when something seems out of place (Nelson & Fivush, 2004).

Productions specify what to do under certain conditions: If A occurs, then do B. A production might be something like "If your goal is to increase student attention and a student has been paying attention a bit longer than usual, then praise the student." People can't necessarily state all their scripts and productions, and they don't even realize that they are following these rules, but they act on them nevertheless. The more practiced the procedure, the more automatic the action and the more implicit (unconscious) the memory (J. R. Anderson, 2020; Schraw, 2006).

Stop & Think Fill in these blanks: MEM _ _ _

The final type of implicit memory involves **priming**, or activating information that already is in long-term memory through some out-of-awareness process. You might have seen an example of priming in the *Stop & Think* fill-in-the-blank question. If you wrote MEMORY instead of MEMOIR or MEMBER or another MEM word then priming may have played a role because the word *memory* has occurred many times in this cluster. Priming may be the fundamental process for retrieval as associations are activated and spread through the memory system (Radvansky & Ashcraft, 2018).

Retrieving Information in Long-Term Memory

When we need to use information from long-term memory, we search for it. Sometimes, the search is conscious, as when you see a friend approaching and search for her name. At other times, locating and using information from long-term memory is automatic, as when you enter a computer password or the word *memory* pops to mind when you see MEM _ _ _. Think of long-term memory as a huge cabinet full of tools (skills, procedures) and supplies (knowledge, concepts, schemas) ready to be brought to the workbench of working memory to accomplish a task. The cabinet (long-term memory) stores an incredible amount, but it may be hard to find what you are looking for quickly. The workbench (working memory) is small, but anything on it is immediately available. Because it is small, however, supplies (bits of information) sometimes are lost when the workbench is overloaded (E. Gagné, 1985). Of course, you have to walk into the room through the door of attention to get to the workbench and the cabinet (Silverman, 2008).

SPREADING ACTIVATION. The size of the network in long-term memory is huge, but only small parts are activated at any one time—in fact, as you saw earlier, some psychologists

believe the smaller activated part of long-term memory *is* working memory. Information is retrieved in this network through **spreading activation**. When a particular proposition or image is active—when we are thinking about it—other closely associated knowledge can be primed or triggered as well, and activation can spread through the network (J. R. Anderson, 2020). Thus, as I focus on the propositions "I'd like to go for a drive to check out the new Target store," related ideas such as "We need laundry detergent" and "The car needs an oil change" come to mind. As activation spreads from the "car trip" to the "oil change," the original thought, or active memory, disappears from working memory because of the limited space. Thus, **retrieval** from long-term memory occurs partly through the spreading of activation from one bit of knowledge to related ideas in the network.

Spreading activation
Retrieval of pieces of information based on their relatedness to one another. Remembering one bit of information activates (stimulates) recall of associated information.

Retrieval
Process of searching for and finding information in long-term memory.

Reconstruction
Re-creating information by using memories, expectations, logic, and existing knowledge.

RECONSTRUCTION. In long-term memory, the information is still available, even when it is not activated and you are not thinking about it at the moment. If spreading activation does not "find" the information we seek, then we might still come up with an answer through **reconstruction**, a cognitive tool or problem-solving process that makes use of logic, cues, and other knowledge to construct a reasonable answer by filling in any missing parts (Koriat et al., 2000). Sometimes reconstructed recollections are incorrect. For example, in 1932, F. C. Bartlett conducted a series of famous studies on remembering stories. He read a complex, unfamiliar Native American tale to students at England's Cambridge University and, after various lengths of time, asked the students to recall the story. Stories the students recalled were generally shorter than the original and were translated into the concepts and language of the Cambridge student culture. The story told of a seal hunt, for instance, but many students remembered (reconstructed) a "fishing trip," an activity closer to their experiences and more consistent with their schemas.

FORGETTING AND LONG-TERM MEMORY. Information appears to be lost from long-term memory through time decay and interference. For example, memory for Spanish–English vocabulary decreases for about 3 years after a person's last course in Spanish, then stays level for about 25 years, and then drops again for the next 25 years. One explanation for this decline is that neural connections, like muscles, grow weak without use. After 25 years, it may be that the memories are still somewhere in the brain, but they are too weak to be reactivated. Also, the physiological deterioration that comes with age could account for the later declines because some neurons simply die. Finally, newer memories may interfere with or obscure older memories, and older memories may interfere with memory for new material (Bahrick, 2000).

As we learn more about the brain and forgetting, researchers are discovering that when people try but fail to remember something, there is increased activity in the left frontal lobe of the brain, but when remembering is successful, the increased activity is in the hippocampal region. Successful recall of sounds also activates the auditory cortex of the brain and successful recall of images activates the visual cortex, almost like re-hearing or re-seeing the event (J. R. Anderson, 2020; Schacter et al., 2020).

Even with decay and interference, long-term memory is remarkable. Information in working memory can be lost and forgotten, but information stored in long-term memory may be available for a long time, given the right cues (Erdelyi, 2010). Teaching strategies that encourage student engagement, deeper processing of information, and higher levels of initial learning are associated with longer retention. Some example strategies are:

- Frequent reviews and tests
- Elaborated feedback
- High standards
- Active involvement in learning projects

Individual Differences in Long-Term Memory

Three individual difference factors affect long-term memory. The first is knowledge. The reason working memory predicts so many abilities is likely because students with higher levels of working memory are better at pulling the right information (knowledge) from long-term memory to solve the current problem or understand the reading passage (Miller-Cotto & Byrnes, 2020).

Think about what it is like to read a very technical textbook in an area you know little about. Every line is difficult. You have to stop and look up words or turn back to earlier sections to read about concepts you don't understand. It is hard to remember what you are reading because you are struggling to understand and remember at the same time. But with a good basis of knowledge, the more you know, the easier it is to know more. This may be why classes in your major seem easier than the required classes outside your major. A related factor could be interest. To develop expert understanding and recall in a domain requires the "continuous interplay of skill (i.e., knowledge) and thrill (i.e., interest)" (Alexander et al., 1994, p. 334).

A second individual difference factor in long-term memory is effective strategy use. Especially as we age, developing better strategies for remembering and retrieving can improve long-term memory (Nyberg & Pudas, 2019). Finally, your ability to control attention is related to better long-term memory, again in part through strategy use. People who can focus their attention tend to learn more efficiently in the first place, apply good learning and memory strategies, and quickly find information when they search long-term memory (McDermott & Zerr, 2019).

Now let's turn to the really important question: How can teachers support the development of long-lasting knowledge?

Module 26 Summary

Long-Term Memory (pp. 349–358)

Compare explicit and implicit memories. The capacity of long-term memory is huge and information can remain in long-term memory indefinitely. The trick is finding it when needed. Memories may be explicit (semantic/declarative or episodic) or implicit (procedural, classical conditioning, or priming).

How is information represented in explicit long-term memory, and what role do schemas play? In explicit (semantic) long-term memory, bits of information may be stored and interrelated in terms of propositional networks, images, concepts, and schemas. The dual coding theory suggests that information coded both verbally and visually (using images) is easier to remember. Much information is stored as concepts. A concept is a mental representation for a category of similar events, ideas, objects, or people that enables people to identify and recognize the members of a group such as books, students, or cats. Concepts provide a manner of organizing diversity among members of a group. Concepts are often represented by prototypes (an ideal example) and exemplars (a representative memory). Concepts also probably are theory-based, that is, based on our ideas about the world and how it works. To organize propositions, images, and concepts, we have schemas, which are data structures that allow us to represent large amounts of complex information, make inferences, and understand new information. In explicit episodic memory, information is stored as events, particularly events in your own life, and may include vivid, flashbulb memories. Episodic memories are not always accurate, especially if adults or children are asked about events using suggestive, repeated, or high-pressure questioning.

What is implicit memory? Implicit memories are out-of-awareness memories that still can affect thinking and behavior. There are three kinds of implicit memories: *classical conditioning*, *procedural memory*, and *priming effects*. We discussed classical conditioning of automatic physiological and emotional responses in Cluster 7. Procedural memory includes skills, habits, and scripts—how to perform tasks—in other words, memory for procedural knowledge. Priming is activating information that already is in long-term memory through some out-of-awareness process. Priming may be the fundamental process for retrieval as associations are activated and spread throughout the memory system.

Why do we forget? Information lost from working memory truly disappears, but information in long-term memory may be available, given the right cues. Information appears to be lost from long-term memory through time decay (neural connections, like muscles, grow weak without use) and interference (newer memories may obscure older memories, and older memories may interfere with memory for new material). There are individual differences in long-term memory based on a person's knowledge, strategy use, and the ability to control attention.

MODULE 27

Putting It All Together: Memorable Learning

Learning Objective 8.4 Describe strategies for supporting students' construction of long-lasting knowledge.

Teaching for Long-Lasting Knowledge: Basic Principles and Applications

How can we make the most effective use of our practically unlimited capacity to learn and remember? For decades, cognitive psychologists have focused on ways of constructing long-lasting declarative, procedural, and self-regulatory knowledge. We will discuss the development of *declarative* and *procedural* knowledge separately, but keep in mind that real learning is a combination and integration of these elements. We look at developing the third type, *self-regulatory* knowledge, in the next cluster when we discuss metacognition.

Constructing Declarative Knowledge: Making Meaningful Connections

We begin with some basic principles that apply across all situations. Daniel Willingham says simply, "Memory is the residue of thought" (2009, p. 54). So, to remember something, students have to do some thinking, that is, they have to *connect new information from the outside with what they already know*. This doesn't just happen as their eyes move across a page of reading. It takes effort. The way you learn information in the first place strongly affects recall later. Here, *elaboration*, *organization*, *imagery*, *context*, *desirable difficulty*, and *effective practice* play important roles.

ELABORATION. Adding meaning to new information by connecting with already existing knowledge is called **elaboration**. In other words, we apply our schemas and draw on already existing knowledge to construct an understanding. Frequently, we change our existing knowledge in the process, as Piaget noted years ago. We often elaborate automatically. For example, a paragraph about a historic figure in ancient Rome tends to activate our existing knowledge about that period; we use the old knowledge to understand the new.

Elaboration
Adding and extending meaning by connecting new information to existing knowledge.

Material that is elaborated when first learned will be easier to recall later. First, as we saw earlier, elaboration is a form of rehearsal that leads to deeper levels of processing because the information is thoroughly analyzed and connected with existing information (Craik, 2020). Second, elaboration builds extra links to existing knowledge. The more one bit of information or knowledge is associated with other bits, the more routes there are to follow to get to the original bit. To put it another way, you have several "handles" or priming/retrieval cues to "pick up" or recognize the information you might be seeking (Bruning et al., 2011).

Learning is improved when students elaborate by *creating their own answers* rather than just recognize or recall answers from the textbook or the teacher (Brown et al., 2014). We also help students elaborate and create when we ask them to:

- Translate into their own words
- Create examples
- Explain to a peer
- Create a metaphor
- Draw a diagram of the situation
- Act out the relations
- Apply the information to new problems

Of course, if students elaborate new information by developing misguided explanations, these misconceptions will be remembered, too, so teacher guidance, feedback, and frequent testing are critical.

Organization
Ongoing process of arranging information and experiences into mental systems or categories. Ordered and logical network of relations.

ORGANIZATION. A second element of processing that improves learning is **organization**. Material that is well organized is easier to learn and to remember than bits and pieces of information, especially if the material is complex or extensive. Chunking is one kind of organization—putting small bits of information into larger, more meaningful chunks. Placing a concept in a structure also will help you learn and remember both general definitions and specific examples. The structure serves as a guide back to the information when you need it. For example, Table 8.1 organizes information about types of cognitive load, and Figure 8.4 organizes my knowledge about reinforcement. The *Guidelines: Family and Community Partnerships* give ideas for working with families to provide all your students more support and practice in organizing learning.

IMAGERY. You may remember the dual coding theory of memory suggests that information coded both visually and verbally is easiest to learn (Butcher, 2006; Paivio, 2006). Imagery can support memory if the information to be learned lends itself to images. It is easier to form an image for *car* than for *internal combustion*, for example—at least for me. Also the ability to form and use mental images appears to vary among individuals; some people are simply better at this task than others (Bruning et al., 2011).

That said, is a picture worth a thousand words in teaching? Richard Mayer (2005, 2011; Xie et al., 2019) has studied this question for several years and has found that the right combination of pictures and words can make a significant difference in students' learning, at least for older students. The problem is how to build complex understandings that

GUIDELINES

Family and Community Partnerships

Organizing Learning

Give families specific strategies to help their children practice and remember.

Examples

1. Develop "super learner" homework assignments that include material to be learned and a "parent coaching card" with a description of a simple memory strategy—appropriate for the material—that parents can teach their child.
2. Provide a few comprehension check questions so a family member can review reading assignments and check the child's understanding.
3. Describe the value of distributed practice, and give family members ideas for how and when to work skills practice into home conversations and projects.

Ask family members to share their strategies for organizing and remembering.

Examples

1. Create a family calendar.
2. Encourage planning discussions in which family members help students break large tasks into smaller jobs, identify goals, and find resources.

Discuss the importance of attention in learning.

Examples

1. Encourage families to create study spaces that are away from distractions.
2. Make sure parents know the purpose of homework assignments.

For a website dedicated to high school study skills that might help parents, see mtsu.edu and search for "study skills."

integrate information from visual (pictures, diagrams, graphs, animations, films) and verbal (text, lecture) sources, given the limitations of working memory. *The solution:* Make sure the information is available at the same time or in focused, small bites. I try to follow this advice. That is why the visual elements of working memory in Figure 8.3 also have words explaining each part.

There is a caution about using multiple representations to teach, however. Younger students need supports such as color coding to draw attention to relevant relations in pictures and diagrams, or frequent checks for understanding—with corrections if they are forming misconceptions (Berthold & Renkl, 2009). The moral of the story? Give students multiple ways to understand—pictures and explanations. But don't overload working memory—"package" the visual and verbal information together in bite-size (or memory-size) pieces, and teach students directly how to learn from illustrations or how to draw their own.

CONTEXT. A fourth element of processing that influences learning is **context**. Aspects of physical and emotional context—places, rooms, moods, who is with us—are learned along with other information. Later, if you try to remember the information, it will be easier if the current context is similar to the original one (Radvansky & Ashcraft, 2018). Context is a kind of priming that activates the information. For example, in a classic study, scuba divers who learned a list of words underwater and then were tested underwater remembered more words than scuba divers who learned underwater but were tested on dry land (Godden & Baddeley, 1975). In another study, students who learned material in one type of room performed better on tests taken in a similar room than they did on comparable tests taken in a very different-looking room (Smith et al., 1978). So studying for a test under "test-like" conditions (e.g., not in front of a TV) may result in improved performance. Of course, you can't always go back to the same place or a similar one to recall something. But if you can picture the setting, the time of day, and your companions, you may eventually reach the information you seek.

Context
Internal and external circumstances and situations that interact with the individual's thoughts, feelings, and actions to shape development and learning. The physical or emotional backdrop associated with an event.

DESIRABLE DIFFICULTY. A fifth element of processing is **desirable difficulty**. It seems like a paradox, but the more effort that is required to remember something (which really means you are *relearning* the information), the stronger the memory will be—as long as the efforts are successful, of course. It may take longer to learn, but long-term recall will be stronger and faster. Desirable difficulty leads to deep processing—and remember, you learn what you think about. Here is a surprising example. When the outline of a lecture varies from the outline of the reading for the lecture, memory for the main ideas is better. One reason is that the effort needed to figure out the main ideas and integrate and reconcile the two different explanations of the same material helps the learners understand the ideas better and make them their own (Brown et al., 2014). When students breeze through readings or answer questions that are too easy, they may get the illusion that they know the content—it all seems so obvious. But without the text, the knowing proves fragile. The students can't really explain the material in their own words.

Desirable difficulty
The more effort that is required to remember something, the better you will learn and the stronger the memory will be—as long as the efforts are successful.

EFFECTIVE PRACTICE. One of the best ways to learn and remember is through **retrieval practice**, often called the **testing effect**. Former fifth-grade teacher and current cognitive psychologist Pooja Agarwal summed it up, "When students practice their knowledge and bring information to mind, their long-term learning increases" (2020, p. 1). To use retrieval practice, you can ask your students to simply write down, say, draw, or chart everything they remember about a specific topic. Agarwal calls this a "brain dump" for her students—the technical name is "free recall." She also recommends asking students to recall just "two things" as an entry or exit ticket for class or as a midpoint check during the lesson. Other retrieval possibilities include having students generate test questions on the material or take ungraded practice quizzes. The recall can be from yesterday's lesson or from a unit completed weeks ago. In applying these retrieval methods, make sure you encourage recall

Retrieval practice/Testing effect
Practicing by retrieving information from memory instead of rereading or restudying—more effective because retrieval seems to help memories consolidate in the brain and strengthens the neural pathways so the knowledge is easier to find later.

of higher-order concepts as well as facts. Emphasizing facts alone is not as effective for learning and remembering more complex ideas (Agarwal, 2019). These simple techniques can be more effective than rereading, restudying, or even using more complicated study strategies (Bae et al., 2019). Repeated recall seems to help memories consolidate in the brain, and it strengthens the neural pathways so the knowledge is easier to find later. As Peter Brown and his colleagues (2014) said, "Retrieval ties the knot for memory. Repeated retrieval snugs it up and adds a loop to make it fast" (p. 28). It appears that age-appropriate retrieval practice is useful for students in every grade level, even young children (Fazio & Marsh, 2019).

Here is another kind of effective practice. Would you predict that children who practiced tossing beanbags into a bucket from 3 feet away would be better or worse at accurate tosses from 3 feet compared to children who practiced from 2 feet and 4 feet but never from 3 feet? Surprisingly, the children who practiced only from 3 feet were *worse* (Brown et al., 2014). **Interleaved practice** is mixing up practice by, for example, tossing from 2 and 4 feet before being tested at 3 feet. (Does this mean that basketball players should practice free throws from different distances? An interesting question!) Another case: homework that requires different strategies so students have to both decide on the strategy they must use to solve the problem *and then also* apply that strategy. This makes practice more like real life where you have to decide what the actual question is and then answer it. For example, a large study of 54 seventh-grade math classes evaluated interleaved math assignments over a four-month period. Half of the students did assignments with no more than two consecutive problems requiring the same solution strategy (interleaved practice). The other half completed assignments with problems that used the same strategy (blocked). On a surprise test a month after the end of the study, the interleaved group scored 61% correct compared to 38% for the blocked group (Rohrer et al., 2020). A study of college-level students learning Spanish found similar positive results for interleaved practice (Pan et al., 2019). But beware, even though research strongly supports the value of interleaved practice, most math textbooks provide blocked problem types. When Doug Rohrer and his colleagues (2020) examined six different middle school math texts, they found five of the texts had mostly blocked practice problem types. Only the Saxon math series had more interleaved than blocked problem sets—about twice as many.

Interleaved practice
Mixing up practice by, for example, tossing from 2 and 4 feet before being tested at 3 feet, solving different types of problems, or practicing different vocabulary words.

We can incorporate many of these strategies by making each lesson as meaningful as possible.

Reaching Every Student: Make It Meaningful

How do we get students to remember something? The answer, according to Daniel Willingham (2009), is get the students to *think about what it means—make it meaningful*. Meaningful lessons are presented in vocabulary that makes sense to the students. New terms are clarified through ties with more familiar words and ideas. Meaningful lessons are well organized, with clear connections between the different elements of the lesson. Finally, meaningful lessons make natural use of old information to help students understand new information through examples, analogies, or stories.

The importance of meaningful lessons is emphasized in *Stop & Think*—an example presented years ago by F. Smith (1975).

Stop & Think Look at the following three lines. Begin by covering all but the first line. Look at it for a second, close the book, and write down all the letters you remember. Then repeat this procedure with the second and third lines.

1. KBVODUWGPJMSQTXNOGMCTRSO
2. READ JUMP WHEAT POOR BUT SEEK
3. KNIGHTS RODE HORSES INTO WAR

Each line has the same number of letters, but the chances are great that you remembered all the letters in the third line, a good number of letters in the second line, and very few in the first line. The first line makes no sense—it has no meaning. There is no way to organize it in a brief glance. Working memory is simply not able to hold and process all those bits of information quickly. The second line is more meaningful. You do not have to see each letter because your long-term memory brings prior knowledge of spelling rules and vocabulary to the task. The third line is the most meaningful. Just a glance and you can probably remember all of it because you bring to this task prior knowledge not only of spelling and vocabulary but also of rules about syntax and probably some historical information about knights (they didn't ride in tanks). This sentence is meaningful because you have existing schemas for assimilating it (Schunk, 2020).

The challenge for teachers is to make lessons less like learning the first line and more like learning the third line. Although this may seem obvious, think about the times when you have read a sentence in a text or heard an explanation from a professor that might just as well have been KBVODUWGPJMSQTXNOGMCTRSO. But beware, attempts to change the ways that students are used to learning—moving from memorizing to meaningful—are not always greeted with student enthusiasm. Students may be concerned about their grades; at least when memorization gains an A, they know what is expected. Meaningful learning can be riskier and more challenging. In Clusters 9, 10, and 14, we will examine a variety of ways in which teachers can support meaningful learning and understanding.

What can you do when students *don't* have a good base of knowledge to make learning meaningful? Mnemonics are memory strategies for getting started.

MNEMONICS. **Mnemonics** are systematic procedures for improving memory (Rummel et al., 2003; Soemer & Schwan, 2012). When information has little inherent meaning, mnemonic strategies help create meaning by connecting what is to be learned with established words or images.

The **loci method** derives its name from the plural of the Latin word *locus*, meaning "place." To use loci, you must first imagine a very familiar place, such as your own house or apartment, and pick out particular locations to serve as "pegs" to "hang" memories. For instance, let's say you want to remember to buy milk, bread, butter, and cereal at the store. Imagine a giant jug of milk blocking the entry hall, a lazy loaf of bread sleeping on the living room couch, a stick of butter melting all over the dining room table, and cereal covering the kitchen floor. When you want to remember the items, all you have to do is take an imaginary walk through your house.

If you need to remember information for long periods of time, an acronym may be the answer. An **acronym** is a form of abbreviation—a word formed from the first letter of each word in a phrase—for example, HOMES to remember the Great Lakes (Huron, Ontario, Michigan, Erie, Superior). Another method forms phrases or sentences out of the first letter of each word or item in a list, for example, Every Good Boy Does Fine to remember the lines on the G clef—E, G, B, D, F. Because the words must make sense as a sentence, this approach also has some characteristics of **chain mnemonics**, methods that connect the first item to be memorized with the second, the second item with the third, and so on. In one type of chain method, each item on a list is linked to the next through some visual association or story. Another chain-method approach is to incorporate all the items to be memorized into a jingle such as "*i* before *e* except after *c*."

The mnemonic system that has been most extensively researched in teaching is the **keyword method**. Joel Levin and his colleagues use a mnemonic (the 3 *R*s) to teach the keyword mnemonic method:

- ***Recode*** the to-be-learned vocabulary item as a more familiar, concrete keyword—this is the keyword.
- ***Relate*** the keyword clue to the vocabulary item's definition through a sentence.
- ***Retrieve*** the desired definition.

Mnemonics
Techniques for remembering; the art of memory.

Loci method
Technique of associating items with specific places.

Acronym
Technique for remembering by using the first letter of each word in a phrase to form a new, memorable word.

Chain mnemonics
Memory strategies that associate one element in a series with the next element.

Keyword method
System of associating new words or concepts with similar-sounding cue words and images.

Connect and Extend to PRAXIS II®

Memory Strategies (II, A1)

Medical students often use mnemonics to remember the vast amounts of information they encounter in their studies. Be familiar with the major mnemonic methods and the kinds of information that they are most suitable for.

Rote memorization
Remembering information by repetition without necessarily understanding the meaning of the information.

Serial-position effect
The tendency to remember the beginning and the end, but not the middle of a list.

Part learning
Breaking a list of items into shorter lists.

Distributed learning/practice
Practice in brief periods with rest intervals.

Massed practice
Practice for a single extended period.

The keyword method has been used extensively in foreign language learning. For example, the Spanish word *carta* (meaning "letter") sounds like the English word *cart*. *Cart* becomes the keyword: You imagine a shopping cart filled with letters on its way to the post office, or you make up a sentence such as "The cart full of letters tipped over." A similar approach has been used to help students connect artists with particular aspects of their paintings. For example, students are told to imagine that the heavy, dark lines of paintings by Rouault are made with a *ruler* (Rouault) dipped in black paint (Carney & Levin, 2000, 2002).

The greatest challenge teachers face is to help students think and understand, not just memorize. Unfortunately, many students view **rote memorization** and learning as the same thing. Still, there are times when memorization is useful for learning new information that has little meaning at first.

If You Have to Memorize…

Every discipline has its own terms, names, facts, and rules. As adults, we want to work with physicians who have memorized the correct drugs needed to combat particular infections. Of course, they can look up some information or research certain conditions, but they have to know where to start. We want to deal with computer salespeople who have memorized their stock and know exactly which printers will work with our computer. Just because something was learned through memorization does not mean it is superficial or unimportant knowledge. The real question is whether you can *use* the information flexibly and effectively to solve new problems.

On rare occasions we even have to memorize something word for word, such as lines in a song, poem, or play. How would you do it? If you have tried to memorize a list of items that are all similar to one another, you may have found that you tended to remember items at the beginning and at the end of the list, but forgot those in the middle. This is called the **serial-position effect**. In fact, when a large group of college students was asked to name the U.S. presidents in order in 1976, another group was asked in 1993, and another in 2014, the findings were the same (DeSoto & Roediger, 2019). Most students in every group remembered the first and last several presidents but forgot the middle presidents—except for Lincoln—the serial-position effect in action. **Part learning**, breaking the list into smaller segments, can help prevent this effect because breaking a list into several shorter lists means there will be fewer middle items to forget.

Another strategy for learning a long selection or list is the use of **distributed learning/practice**, something educational psychologists have known about since the late 1880s (Ebbinghaus, 1885/1964). A student who studies Hamlet's soliloquy intermittently throughout the week will probably do much better than a student who tries to memorize the entire speech on Sunday night. Studying for an extended period is called *massed practice*. **Massed practice** leads to cognitive overload, fatigue, and lagging motivation. Distributed or spaced learning/practice gives time for deeper processing and strengthens the connections in the neural network of the brain. What is forgotten after one session can be relearned in the next with distributed practice (Agarwal et al., 2012; Karpicke & Grimaldi, 2012; Pashler et al., 2007; Son & Simon, 2012). Be warned, however, that research has consistently shown that even though *distributed practice* leads to better learning and remembering, students (including adults) prefer *massed practice*—another example that what we like best (I'm thinking nachos dripping with cheese and jalapeños for a late-night snack) may not be best for us.

To incorporate distributed learning into your classes, make sure students are exposed to key concepts, terms, and skills on at least two occasions separated by several weeks or even months, and use homework and exams to promote spaced review. *Interleave practice* by sprinkling skills from earlier units into current homework and tests. Students get needed spaced learning and practice and also the motivation that comes with a sense of mastery—look how easy those earlier problems are now (Pashler et al., 2007). Shana Carpenter and her colleagues (2012) also recommend that teachers:

- Review important information every several weeks—keep updating these reviews with recent information.

- Re-expose students to important information in homework assignments, even several weeks after they first learned the material.
- Give exams and quizzes that are cumulative so students will be motivated to review and space out their study sessions on their own.

Lessons for Teachers: Declarative Knowledge

There are at least two clear lessons for teachers and teaching in the research on learning declarative knowledge. The first is the importance of connections—connecting to what the student already knows, connecting pictures and words to support understanding, connecting different specific examples of concepts to understand the abstract idea, and connecting to the context where information was first learned. The second lesson is the power of deep processing—processing by elaborating new information, processing by forming images, processing by reviewing over time, processing by dealing with difficulty and persisting, and processing through questioning.

Development of Procedural Knowledge

One characteristic that distinguishes experts from novices in every arena, from reading to medical diagnosis, is that the experts' declarative knowledge has become "proceduralized," that is, incorporated into routines they can apply automatically without making many demands on working memory. Explicit memories have become implicit, and the expert is no longer aware of them. Skills that are applied without conscious thought are called **automated basic skills**. An example is shifting gears in a standard transmission car. At first, you have to think about every step, but as you become more expert (if you do), the procedure becomes automatic. But not all procedures can be automatic, even for experts in a particular domain. For example, no matter how expert you are in driving, you still have to consciously watch the traffic around you. This kind of conscious procedure is called a *domain-specific strategy*. Automated basic skills and domain-specific strategies are learned in different ways (Gagné et al., 1993).

Automated basic skills
Skills that are applied without conscious thought.

AUTOMATED BASIC SKILLS. Most psychologists identify three stages in the development of an automated skill: *cognitive, associative*, and *autonomous* (J. R. Anderson, 2020; Fitts & Posner, 1967). At the *cognitive stage*, when we are first learning, we rely on declarative knowledge and general problem-solving strategies to accomplish our goal. For example, to learn how to assemble a bookshelf, we might try to follow steps in the instruction manual, putting a check beside each step as we complete it to keep track of progress. At this stage, we have to "think about" every step and perhaps refer back to the pictures of parts to see what a "4-inch metal bolt with lock nut" looks like. The cognitive load on working memory is heavy. There can be quite a bit of trial-and-error learning at this stage when, for example, the bolt we chose doesn't fit or we attach the shelves upside down.

Connect and Extend to PRAXIS II®
Developing Basic Skills (II, A3)
Efficient and effective performance as a learner requires the automatic use of basic skills. Describe what teachers can do to help students develop automatic basic skills.

At the *associative stage*, errors are identified and eliminated (we stop attaching those shelves upside down), and individual steps of a procedure are combined or "chunked" into larger units. We reach for the right bolt and put it into the right hole. One step smoothly cues the next. With practice (there's that word again), the associative stage moves to the *autonomous stage*, where the whole procedure can be accomplished without much attention. So if you assemble enough bookshelves, you can have a lively conversation as you do, paying little attention to the assembly task. This movement from the cognitive to the associative to the autonomous stage holds for the development of basic cognitive skills in any area, but science, medicine, chess, and mathematics have been most heavily researched. One thing is clear—it takes many hours of successful practice to make skills automatic. In addition, to become a real expert at a skill, practice must be deliberate. **Deliberate practice** means comparing your performance to a high standard, monitoring how well you are doing, seeking and using feedback, and focusing on areas that need improvement. Just repeating what you already know how to do won't make you an expert (Ericsson, 2011).

Deliberate practice
Comparing your performance to a high standard, monitoring how well you are doing, seeking and using feedback, and focusing on areas that need improvement.

What can teachers do to help their students pass through these three stages and become more expert learners? In general, two factors are critical: *prerequisite knowledge* and *practice with feedback*. First, if students don't have the essential prior knowledge (concepts, schemas, skills, etc.), the cognitive load on working memory will be too great. Second, practice with feedback allows you to form associations, recognize cues automatically, and combine small steps into larger productions. Even from the earliest stage, some of this practice should include a simplified version of the whole process in a real context. Practice in real contexts helps students learn not only *how* to do a skill but also *why and when* (Collins et al., 1989; Gagné et al., 1993). Of course, as every athletic coach knows, if a particular step, component, or process is causing trouble, that element might be practiced alone until it becomes more automatic and then put back into the whole sequence to lower the cognitive load on working memory (J. R. Anderson et al., 1996; Ericsson, 2011; Ericsson & Pool, 2016).

DOMAIN-SPECIFIC STRATEGIES. As we saw earlier, some procedural knowledge, such as monitoring the traffic while you drive, is not automatic because conditions are constantly changing. Once you decide to change lanes, the maneuver may be fairly automatic, but the decision to change lanes was conscious, based on the traffic conditions around you. **Domain-specific strategies** are consciously applied skills that organize thoughts and actions to reach a goal. To support this kind of learning, teachers need to provide opportunities for practice in many different situations—for example, practice reading with package labels, magazines, books, letters, operating manuals, web pages and so on. In the next cluster's discussion of problem-solving and study strategies, we will examine other ways to help students develop domain-specific strategies. For now, let's summarize these ideas for developing declarative and procedural knowledge in the *Guidelines: Helping Students Understand and Remember*. We will spend quite a bit of time in the next cluster on developing self-regulatory knowledge.

Domain-specific strategies
Consciously applied skills to reach goals in a particular subject or problem.

GUIDELINES

Helping Students Understand and Remember

Make sure you have the students' attention.

Examples

1. Develop a signal that tells students to stop what they are doing and focus on you. Make sure students respond to the signal—don't let them ignore it. Practice using the signal.
2. Move around the room, use gestures, and avoid speaking in a monotone.
3. Begin a lesson by asking a question that stimulates interest in the topic.
4. Regain the attention of individual students by walking closer to them, using their names, or asking them a question.

Help students separate essential from nonessential details and focus on the most important information.

Examples

1. Summarize instructional objectives to indicate what students should be learning. Relate the material you are presenting to the objectives as you teach: "Now I'm going to explain exactly how you can find the information you need to meet Objective 1 on the board—determining the tone of the story."
2. When you make an important point, pause, repeat, ask a student to paraphrase, note the information on the board in color, or tell students to highlight the point in their notes or readings.

Help students make connections between new information and what they already know.

Examples

1. Review prerequisites to help students bring to mind the information they will need to understand new material: "Who can tell us the definition of a quadrilateral? Now, what is a rhombus? Is a square a quadrilateral? Is a square a rhombus? What did we say yesterday about how you can tell? Today we are going to look at some other quadrilaterals."
2. Use an outline or diagram to show how new information fits with the framework you have been developing. For example, "Now that you know the duties of the FBI, where would you expect to find it in this diagram of the branches of the U.S. government?"
3. Give an assignment that specifically calls for the use of new information along with information already learned.

Space out learning and provide for repetition and review of information.

Examples

1. Begin class with a quick review of the homework assignment.
2. Give frequent, short tests.
3. Build practice and repetition into games, or have students work with partners to quiz each other.

Present material in a clear, organized way.

Examples

1. Make the purpose of the lesson very clear.
2. Give students a brief outline to follow. Project the same outline with a smartboard or overhead projector so you can keep yourself on track. When students ask questions or make comments, relate these to the appropriate section of the outline.
3. Use summaries in the middle and at the end of the lesson.

Manage cognitive load.

Examples

1. In the beginning, eliminate details or decorations that distract from the main ideas.
2. Give students strategies for keeping up with information as they go along—mapping relationships, defining key terms, or writing 1-minute summaries.
3. Be aware that some students may need to work with earplugs or in areas of the room where they are not distracted by movement.

Focus on meaning, not memorization.

Examples

1. In teaching new words, help students associate the new word to a related word they already understand: "*Enmity* is from the same base word as *enemy*."
2. When teaching about remainders, have students group 12 objects into sets of 2, 3, 4, 5, and 6, and ask them to count the "leftovers" in each case.
3. Encourage students to generate their own answers and examples as well as ask their own questions.

Use multiple examples, cases, and stories to teach.

Examples

1. Give both abstract and concrete examples of new concepts, such as adding with concrete objects and adding with numbers and formulas.
2. Have students create stories and cases that show applications of concepts they are learning.

Remember the power of practice.

Examples

1. Interleave practice—mix up types of problems, physical skills, or related concepts.
2. Distribute practice—repeat and review with at least 2 weeks in between.
3. Make practice deliberate—monitor performance in relation to a high standard and focus on needed improvements. Don't keep practicing what you already do well.

For more information on applying learning principles, see http://www.apa.org/ed/schools/cpse/top-twenty-principles.pdf and http://ies.ed.gov/ncee/wwc/PracticeGuide.aspx?sid=1.

Module 27 Summary

Teaching for Long-Lasting Knowledge: Basic Principles and Applications (pp. 359–367)

What supports the development of declarative knowledge? The way you learn information in the first place affects its recall later. One important requirement is to integrate new material with knowledge already stored in long-term memory using elaboration, organization, imagery, context, desirable difficulty, and effective practice (spaced learning and interleaved practice). The dual coding theory suggests that information coded both verbally and visually is easier to remember. Pictures and words help students learn as long as they are well organized and do not overload working memory. Another view of memory is the levels of processing theory, in which recall of information is determined by how completely it is processed.

Describe three ways to develop declarative knowledge. Declarative knowledge develops as we integrate new information with our existing understanding. Making the information to be remembered meaningful is important and often is the greatest challenge for teachers. Second, mnemonics are memorization aids including approaches such as the loci method, acronyms, chain mnemonics, and the keyword method. A powerful but limiting way to remember is rote memorization, which can best be supported by part learning and distributed practice. In sum, there are at least two clear lessons for teachers and teaching in the research on learning declarative knowledge. The first is the importance of connections—connecting to what the student already knows, connecting pictures and words to support understanding, connecting different specific examples of concepts to understand the abstract idea, and connecting to the context in which information was first learned. The second lesson is the power of deep processing—processing by elaborating new information, processing by forming images, processing by reviewing over time, processing by dealing with difficulty and persisting, and processing through questioning.

Describe some methods for developing procedural knowledge. Automated basic skills and domain-specific strategies—two types of procedural knowledge—are learned in different ways. There are three stages in the development of an automated skill: cognitive (following steps or directions guided by declarative knowledge), associative (combining individual steps into larger units), and autonomous (where the whole procedure can be accomplished without much attention). Prerequisite knowledge and practice with feedback help students move through these stages. Domain-specific strategies are consciously applied skills of organizing thoughts and actions to reach a goal. To support this kind of learning, teachers need to provide opportunities for practice and application in many different situations.

Cluster 8 Review

Key Terms

Acronym
Attention
Automated basic skills
Automaticity
Bottom-up processing
Central executive
Chain mnemonics
Chunking
Cognitive load
Cognitive science
Cognitive view of learning
Concept
Context
Decay
Declarative knowledge
Defining attribute
Deliberate practice
Desirable difficulty
Distributed learning/practice
Domain-specific knowledge
Domain-specific strategies
Dual coding theory
Elaboration
Elaborative rehearsal
Episodic buffer
Episodic memory

Exemplar
Explicit memory
Extraneous cognitive load
Flashbulb memories
General knowledge
Gestalt
Images
Implicit memory
Information processing
Interference
Interleaved practice
Intrinsic cognitive load
Keyword method
Levels of processing theory
Loci method
Long-term memory
Maintenance rehearsal
Massed practice
Mirror systems
Mnemonics
Organization
Part learning
Perception
Phonological loop
Priming
Procedural knowledge
Procedural memory
Productions
Propositional network
Prototype
Reconstruction
Retrieval
Retrieval practice/testing effect
Rote memorization
Schemas (*singular,* schema)
Script
Self-regulatory knowledge
Semantic memory
Sensory memory
Serial-position effect
Short-term memory
Spreading activation
Source monitoring
Story grammar
Theory-based
Top-down processing
Visuo-spatial sketchpad
Working memory

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Multiple-Choice Questions

1. Rachel had been practicing her multiplication tables for weeks before her yearly standardized test. She knew all of her facts completely. This type of knowledge that Rachel now has attained does not require attention and concentration. This process is known as which one of the following?

A. Declarative memory
B. Flashbulb memory
C. Automaticity
D. Schema

2. Elaboration occurs when one adds meaning to new information by connecting with already existing knowledge. In other words, we apply our schemas and draw on already existing knowledge to construct an understanding. Which of the following is NOT true of elaboration?

A. Elaboration can occur automatically.
B. Material that is elaborated when first learned will be easier to recall later.
C. Elaboration can limit the number of links to stored knowledge.
D. The more students elaborate new ideas, the deeper their understanding and the better their memory for the knowledge will be.

3. Miss Campbell wanted to ensure that her driver's education students were safe under all circumstances. To ensure this, she had her students drive in the rain and snow. She also made sure they had adequate practice for driving in traffic and on the highway. Miss Campbell was encouraging the development of which of the following strategies?

A. Domain-specific
B. Mnemonic
C. Declarative
D. Elaborative

4. *Cognitive load* is a term that refers to the amount of mental resources, mostly working memory, required to perform a particular task. Of the two types of cognitive load, which can instruction support by asking students to explain the material to each other or to themselves, drawing or charting their understandings, or taking useful notes?

A. Intrinsic cognitive load
B. Extraneous cognitive load
C. Needed cognitive load
D. Working cognitive load

Constructed-Response Questions

Case

Reflecting on his first year as a teacher, Mr. Beech was a little embarrassed at how little he had understood the teaching and learning process when he began teaching. He remembered handing back a math test and admonishing his students with the following words: "Everybody in this room knew the test

was today. I can't believe not one of you passed it. All I can say is, you had better master these concepts before we get into the testing season. Thirty percent of the standardized test is on algebra. I know we did several chapters quickly this time, more than you were used to, but we have to finish this book. And, no, I will not let you retake this test."

5. Explain the three types of knowledge Mr. Beech's students probably had to use while taking the algebra test.
6. In addition to not overloading his students with new information, how else can Mr. Beech assist his students in understanding and remembering in the future?

What Would They Do?

Teachers' Casebook: Remembering the Basics

At the beginning of this cluster, we asked you to think critically about how to help students remember important, basic information so that they can build a solid foundation of knowledge for future learning. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Valerie S. Fields • 11th- and 12th-Grade AP Psychology Teacher
Eagle's Landing Christian Academy, McDonough, GA

This is so often the case at the beginning of the year in my AP Psychology class. Some students have the luxury of drawing on concepts from anatomy or statistics class, but many are coming into this cold in terms of a knowledge base related to the scientific fundamentals of Psychology. One of the activities I provide the first week of class involves taking a quick learning preferences quiz. This gives each student an idea of how they perceive themselves learning best and introduces them to a variety of other learning strategies they may not have considered like drawing, repetition, or physical movement. I like to have students create examples of effortful processing strategies to include mnemonics, chunking and hierarchies. From my experience the most powerful way to aid in retaining and retrieving information is making it personally meaningful. Sometimes things don't "stick" because the student has no experience with the word or concept, so they just move through it and don't retain the information. If they can make the leap to "yeah, I know somebody who…"(celebrities are a wellspring) or you can create a desire to delve deeper, that is super helpful.

Kelly L. Hoy • 5th-Grade Humanities Teacher
Katherine Delmar Burke School, San Francisco, California

As a teacher I find it challenging, yet extremely rewarding, to help students who are figuring out how they learn. Each student is a unique puzzle and it's important to create a safe space where students feel comfortable taking risks, trying new techniques, and communicating their successes and failures. In my fifth-grade classroom I tout, "It's not about the grade; it's about the learning." I would impress upon the children that we are a family of learners and elicit the strategies or techniques that lead them to master the material. This idea of sharing how we study or learn could be done directly after a test, at the start of a unit, or in preparation for an upcoming unit test.

My first inclination in helping the students who are struggling to memorize the foundational vocabulary would be to carve out time to meet with each student. Having conversations with the children is invaluable on a myriad of levels. I would be curious to know how much time they put into studying the material. How do they study or what approach are they using to learn the information? What has been successful for them in their past learning experiences? With technology so readily available to students, I would want to know if they are becoming distracted from the task at hand. (I certainly am guilty of the distraction of social media.) Not retaining the material could also be a matter of discipline, and maybe the students need someone to oversee the work. I might suggest the students time themselves and take intermittent breaks during study time. This one-on-one conversation would hopefully lead to a discussion about how the students think they learn best.

After conferring with the students and probing to find out how they approach learning, I would give them some options that deviate from a rote memory approach. Looking up the derivation of the vocabulary and where it comes from can sometimes help the student categorize the word and shows it in relationship to other words. Another way to commit the word to memory would be to create a graphic organizer in which the student folds a paper in quadrants with the vocabulary word in the center. In each quadrant the student: writes synonyms, draws a picture to represent the word, creates a child friendly definition and writes all the things "the word is not." The children might need to hear the word, so they could record themselves saying the word and playing around with its meaning. Engaging in a game of charades, or drawing the definition and having people guess the word could be another playful way to learn its meaning. Children can create a comic book or create graphics that use the vocabulary in a meaningful way. Another way to learn pertinent vocabulary would be to use technology and create a "podcast" or a "tweet" using the

vocabulary. With the teacher's guidance, the students are creating interactive ways to engage with vocabulary and use a variety of strategies to master the basics.

Paula Colemere • Special Education English and History Teacher
McClintock High School, Tempe, AZ

I always evaluate my test results to see if student mistakes came from a poorly written question. If a number of students are missing the same test question, I review the answers to see what went wrong. This helps me to see if I need to alter my test or alter my instruction. As a teacher, I am constantly reflecting on my successes and defeats. Did I set a purpose for learning at the beginning of the unit? Did I make connections to prior knowledge? Before giving this unit test, was there sufficient formative assessment along the way? It makes more sense to pay attention during lessons to see what students understand and where they need more instruction. For students who are struggling along the way, I would spend a little more time on a concept and offer extra help during lunch or after school to help them gain a better understanding. I would teach them how to organize information and how to study. Chunking information is another good strategy to help students who struggle. I also teach test-taking skills to help students build confidence in their test-taking abilities.

Lauren Rollins • 1st-Grade Teacher
Boulevard Elementary School, Shaker Heights, OH

I promote different styles of teaching and learning in my classroom. However, I usually present some material, such as vocabulary words, math facts, and sight words, using a rote memory approach. In this situation, that method seemed to work well for the majority of the students, but not all of them. Therefore, it is my job as the teacher to create opportunities for those students to work with the material in a different way. In the example of the vocabulary, I would help the students create their own dictionaries where they would define each vocabulary word in a way that makes sense to them and provide examples that they would remember. Once the vocabulary becomes more meaningful to them, it will be easier for them to remember. In my classroom, I try to provide the students with a variety of methods to practice these types of concepts. Coloring pages, matching activities, word/number searches, secret codes, games, books, and so on are available to my students to help them practice sight words and math facts every day. I encourage my students to serve as peer tutors and enlist parents to work one on one with students as well. Every little bit helps!

Sara Vincent • High School Special Education Teacher
Langley High School, McLean, VA

Every individual learns differently. The teacher in this scenario should first take time to identify how the students learn material effectively. Their inability to master the material may stem from a note-taking problem; students may benefit more from a cloze note-taking format rather than attempting to decipher what information is important. In addition, the teacher should administer smaller assessments more frequently before the final test in order to determine if all students are grasping the information. The teacher could then provide remediation to those students who are still struggling with the material. Every day, a teacher should evaluate her delivery of the information. She should also assess if the students are learning the material. In other words, no one can be a perfect teacher; effective teaching is always a work in progress.

Jessica N. Mahtaban • 8th-Grade Math Teacher
Woodrow Wilson Middle School, Clifton, NJ

Mind mapping would be a great tool to help students retain and retrieve information. It is a fast and fun way to take visual notes, expand students' visual thinking skills, and make learning meaningful. Graphic organizers are another phenomenal instrument to use that steers the students away from just memorizing facts. A graphic organizer expands students' higher-level thinking skills and helps them make connections. A student's prior knowledge helps him or her build on lessons and make connections with new information. When a student can relate to the content and have meaningful connections, a whole new classroom emerges!

The next step would be to teach students how to comprehend the material rather than just retain the material. Teachers need to provide students with strategies they can use to comprehend all the subjects. Also, teachers need to provide students with plenty of modeling! Modeling all the strategies students can use to comprehend material will benefit the students the most!

Jennifer L. Matz • 6th-Grade Teacher
Williams Valley Elementary, Tower City, PA

I review vocabulary every day at the start of the lesson. This only takes a few minutes. My students make flip books. Flip books are better than flash cards because students can test themselves and flash cards can be lost. We write the definition, but then we write it in "kid" words too. I ask them to explain words or events in their own words.

Some review ideas are: Make up two sets of cards: one set with the words, the other set with the definition. Pass out both sets to the class, and ask "word people" to find their "matching definition." Another is to have a student come to the front and cover his eyes. Write the word on the board, and have the class give him clues. They may not say the word—he must guess it.

Make up songs to help students remember information. When I taught second grade, we had an array of grammar songs and rhymes to remember nouns, pronouns, and so on. My students made up movements. You can pair students who have mastered material with those who have not. Students often have better ways of remembering things than we can teach them.

Cluster 9

Complex Cognitive Processes



Makenna W., Age 2, Arkansas, USA

Teachers' Casebook:

Uncritical Thinking

What Would You Do?

Writing a research paper is an important assignment in your class every year. As you review this year's first drafts, you notice more and more students are relying on the Internet for most or all their information. In itself, using the web is not a bad strategy, but the students appear to be completely uncritical about what they are finding. "If it is on the web, it must be right" is the belief of most students. In addition, their first drafts are filled with quotes that seem very biased to you, and there are no sources cited or listed. It is not just that students don't reference their work. You are more concerned that they cannot critically evaluate what they are reading. And all they are reading comes from online searches! You realize the students need some targeted instruction to develop the higher-order thinking skills they need to critically and strategically sift through online content and other sources too.

Critical Thinking

- How would you help your students evaluate the information they are finding online?
- Beyond this immediate issue, how will you help students think more critically about the topics they are learning?
- How will you take into account the personal beliefs and histories of your students as you support their critical thinking?

Overview and Objectives

The complex cognitive skills we will examine in this cluster take us beyond the simpler, more basic processes of perceiving, representing, and remembering (though after reading Cluster 8 you may believe that there is nothing "simple" about these processes). Much of what we consider in this cluster has been described as "higher-order" thinking, that is, thinking that moves beyond remembering facts and ideas to truly understanding, dissecting, and evaluating those facts or even creating new concepts and ideas of your own. Of course, it is difficult to know exactly what kind of thinking any particular student is doing without also knowing the basis for that thinking. A student who parrots a principle memorized from a science textbook might sound "higher level," but the thinking is just lower-level, rote memory. I (Anita in this cluster) am reminded of the great bar scene in the film *Good Will Hunting* when the pretentious graduate student tried to embarrass Matt Damon's friend with an impressive analysis of history, only to be devastated when Damon nailed him for basing his supposed creative analysis entirely on memorized passages from textbooks—great stuff! In this cluster, we will explore what it takes for students to engage in truly deep, complex thinking and how teachers can help them. First we examine the complex cognitive process of metacognition—using knowledge and skills about learning, motivation, and yourself to plan and regulate your own learning. Next we explore learning strategies, problem solving, and critical thinking, including argumentation. Then we will consider the question of how to encourage the transfer of learning from one situation to another to make learning more useful. Finally, we bring together many key ideas from this cluster by considering how teaching can develop robust knowledge and support complex learning.

By the time you have completed this cluster, you should be able to:

9.1 Discuss the roles of metacognition in learning and remembering.

9.2 Describe several learning and study strategies that help students develop their metacognitive abilities.

9.3 Explain the processes involved in problem solving and the factors that can interfere with successful problem solving.

9.4 Identify factors that influence students' abilities to think critically and to form and support arguments.

9.5 Discuss how, why, and when knowledge learned in one situation might be applied to new situations and problems.

9.6 Explain what characterizes robust knowledge, how to recognize it, and how teaching can develop robust knowledge.

OUTLINE

Teachers' Casebook—Uncritical Thinking: What Would You Do?
Overview and Objectives

MODULE 28: Metacognition and Learning Strategies
Metacognition
- Metacognitive Knowledge and Regulation
- Individual Differences in Metacognition
- Lessons for Teachers: Developing Metacognition

Learning Strategies
- Being Strategic About Learning
- Visual Tools for Organizing
- Retrieval Practice: Powerful but Underused
- Reading Strategies
- Applying Learning Strategies
- Reaching Every Student: Teaching How to Learn

MODULE 29: Problem Solving and Expertise
Problem Solving
- Identifying: Problem Finding
- Defining Goals and Representing the Problem
- Searching for Possible Solution Strategies
- Anticipating, Acting, and Looking Back
- Factors That Hinder Problem Solving
- Expert Knowledge and Problem Solving

MODULE 30: Critical Thinking, Transfer, and Complex Learning
Critical Thinking and Argumentation
- What Critical Thinkers Do: Paul and Elder's Model
- Teaching Critical Thinking
- Thinking Critically About Online Sources
- Argumentation

Teaching for Transfer
- The Many Views of Transfer
- Teaching for Positive Transfer

Bringing It All Together: Teaching for Complex Learning and Robust Knowledge
- What Is Robust Knowledge?
- Teaching for Robust Knowledge

Cluster 9 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Uncritical Thinking: What Would They Do?

MODULE 28 Metacognition and Learning Strategies

Learning Objective 9.1 Discuss the roles of metacognition in learning and remembering.

Learning Objective 9.2 Describe several learning and study strategies that help students develop their metacognitive abilities.

Metacognition

In Cluster 8, we discussed a number of **executive control processes**, including attention, rehearsal, organization, imagery, elaboration, and practice. These executive control processes are sometimes called *metacognitive* skills because they can be intentionally used to regulate cognition.

Executive control processes
Processes such as selective attention, rehearsal, elaboration, and organization that influence encoding, storage, and retrieval of information in memory.

Metacognition
Knowledge about your own thinking processes and how to control them along with the skills to regulate your thinking.

Metacognitive Knowledge and Regulation

Metacognition literally means cognition about cognition, or thinking about thinking. Metacognition consists of knowledge and skills—*knowledge* about your own information-processing capabilities, the cognitive tasks you face, and the strategies needed to cope with those tasks, along with the *skills* involved in applying those strategies (Artelt & Schneider, 2015).

First the knowledge; metacognition involves all three kinds of knowledge we discussed earlier: (a) *declarative knowledge* about yourself as a learner, the factors that influence your learning and memory, the strategies and resources needed to perform a task, and the value of applying strategies—*knowing what* to do; (b) *procedural knowledge* or *knowing how* to use the strategies; and (c) *self-regulatory knowledge* to ensure the completion of the task—*knowing the conditions*, when and why, to apply the procedures and strategies (Bruning et al., 2011). Metacognition is the strategic application of this declarative, procedural, and self-regulatory knowledge to accomplish goals and solve problems (Schunk, 2020). The self-regulation aspect of metacognition is so important for teaching and learning that we will spend much more time on it in Cluster 11.

As to the skills, there are three essential metacognitive skills: *planning*, *monitoring*, and *evaluating* (Brown, 1987; Zepeda et al., 2019). *Planning* involves deciding how much time to give to a task, where to focus attention, what time of day you are most productive, which strategies to use, how and where to start, which resources to gather, what order to follow, and so on. *Monitoring* is the real-time awareness of "how I'm doing." Monitoring is asking, "Is this making sense? Am I trying to go too fast? Should I be taking notes?" *Evaluating* involves making judgments about the processes and outcomes of thinking and learning. "Should I give up for now? Get help? Is this paper (painting, model, poem, plan, etc.) finished?" (Barzilai & Zohar, 2014; Sawyer, 2006). Different metacognitive strategies and skills can be important in different school subjects. For example, in second-language learning, you have to focus on the important elements of the new language, ignore distracting information, and suppress what you know in the first language that interferes with or confuses learning the second language (Engel de Abreu & Gathercole, 2012).

Of course, we don't have to be metacognitive all the time. Some actions become routine or habits. Metacognition is most useful when tasks are challenging, but not too difficult. And even when we are planning, monitoring, and evaluating, these processes are not necessarily conscious, especially in adults. We may use them automatically without being aware of our efforts (Perner, 2000). Experts in a particular field plan, monitor, and evaluate as second nature; they have difficulty describing their metacognitive knowledge and skills (Pressley & Harris, 2006; Reder, 1996).

Individual Differences in Metacognition

People differ in how well and how easily they use metacognitive strategies. Some differences in metacognitive abilities are the result of development. It now appears that even very young children have a metacognitive system that allows them to automatically evaluate and regulate their own cognition—to evaluate thoughts and beliefs, for example, but this metacognition is implicit, outside awareness. This implicit metacognitive system

makes some sense because infants and young children do quite a bit of learning on their own, without direct feedback from others. They have to evaluate and correct beliefs about the world on their own. With brain development, particularly in the prefrontal cortex, children are more aware of their own metacognition and able to explicitly evaluate and regulate their thinking (Goupil & Kouider, 2019). But young children may not be good at gauging the difficulty of a task—they may think that reading for fun and reading a science book are the same (Gredler, 2009b). As children grow older and more aware of thinking about their thinking, they are more able to exercise executive control over strategies. For example, they are more able to determine if they have understood instructions or if they have studied enough to remember a set of items. Explicit metacognitive abilities begin to develop around ages 5 to 7 and improve throughout school (Flavell et al., 1995; Woolfolk & Perry, 2015). As we will see many times in this book, however, *knowing and doing are not the same* (O'Leary & Sloutsky, 2019). Students may know that it is better to study on a regular basis but still cram in the hopes that "this one time it will work."

Not all differences in metacognitive abilities have to do with age or maturation (Lockl & Schneider, 2007; Vidal-Abarca et al., 2010). Some individual differences in metacognitive abilities are probably caused by differences in biology or learning experiences. Many students diagnosed as having specific learning disabilities have trouble monitoring their attention (Hallahan et al., 2019), particularly with long tasks. Working to improve metacognitive skills can be especially important for students who face learning challenges (Schunk, 2020; Swanson, 1990).

Lessons for Teachers: Developing Metacognition

Metacognitive skills are related to learning, school achievement, and motivation, to name just a few important outcomes (Zepeda et al., 2019). Like any knowledge or skill, metacognitive knowledge and skills can be learned and improved.

METACOGNITIVE DEVELOPMENT FOR YOUNGER STUDENTS. In his second-grade classroom in Queens, New York, Daric Desautel (2009) worked with mostly Latino and Asian students. As part of teaching literacy, Desautel decided to focus on student metacognitive knowledge and skills such as setting goals, planning, evaluating achievements, and self-reflection to help students develop the habit of "looking in" at their own thinking. He also included self-reflections to help students evaluate their writing and gain insight into themselves as readers and writers. For example, one self-reflection included a checklist asking:

- Did you pick a topic that you know all about?
- Did you write a special beginning that makes the reader want more?
- Did you organize your thoughts and make a Table of Contents?
- Did you pick the right kind of paper and illustrate your book clearly?
- Did you reread your work to check for SOUND, SENSE, ORDER, and GOOFS?

Desautel was successful in helping all his students, not just the most verbal and advanced, develop metacognitive knowledge. One student noted in his reflection, "I worked hard and did my best to make this book. I like nonfiction books better than stories. Next time, I would write about a different sport" (p. 2011).

In her work with first- and second-graders, Nancy Perry found that asking students two questions helped them become more metacognitive. The questions were "What did you learn about yourself as a reader/writer today?" and "What did you learn that you can do again and again and again?" When teachers asked these questions regularly during class, even young students demonstrated fairly sophisticated levels of metacognitive understanding and action (Perry et al., 2000; Perry et al., 2002).

KWL
A strategy to guide reading and inquiry: Before—What do I already *know*? What do I *want* to know? After—What have I *learned*?

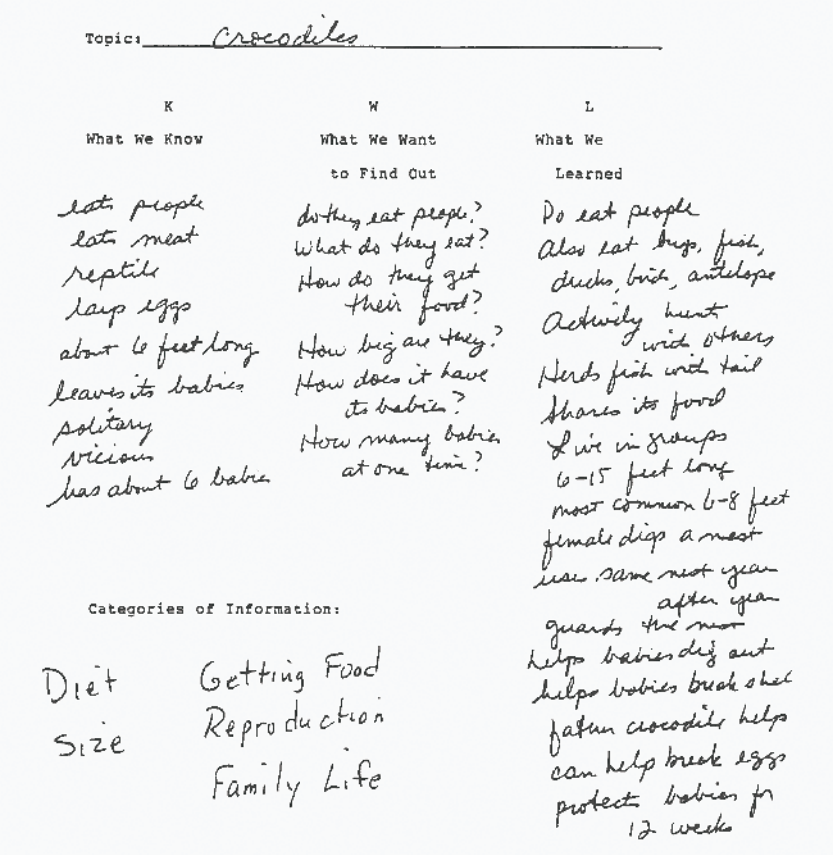
Many of the cooperating teachers I work with use a strategy called **KWL** to guide nonfiction reading and inquiry in general. This general frame can be used with most grade levels. The steps are:

K What do I already *know* about this subject?

W What do I *want* to know?

L At the end of the reading or inquiry, what did I *learn*?

Figure 9.1 A KWL Worksheet for Learning About Crocodiles


Topic: Crocodiles

K What We Know	W What We Want to Find Out	L What We Learned
eats people eats meat reptile lays eggs about 6 feet long leaves its babies solitary vicious has about 6 babies	do they eat people? what do they eat? How do they get their food? How big are they? How does it have its babies? How many babies at one time?	Do eat people Also eat boys, fish, ducks, birds, antelope Actively hunt with others Herds fish with tail shares its food Live in groups 6-15 feet long most common 6-8 feet female digs a nest use same nest year after year guards the nest helps babies dig out helps babies break shell father crocodile helps can help break eggs protects babies for 12 weeks

Categories of Information:

Diet
Size
Getting Food
Reproduction
Family Life

Source: Gillet, J. W., Temple, C., Temple, C., & Crawford. A. (2017), *Understanding reading problems* (9th ed.). Boston: Pearson, p. 140. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., New York, NY.

The KWL frame encourages students to "look within" and identify what they bring to each learning situation, where they want to go, and what they actually achieved—a very metacognitive approach to learning. Look at Figure 9.1 and let's consider the example of learning about "crocodiles" (Gillet et al., 2017). In the ***K*** step, the teacher guides the class in brainstorming—what do you already know (or think you know) about crocodiles? Next, in the ***W*** step, what are you curious about? What do you want to learn? What interests you? The students write down specific questions to answer so they have a personal commitment to the information. Next, considering what you know and want to learn, what kinds of information do you expect to find when you read? How might the author have organized the material using what categories or major divisions (Vacca et al., 2014)? These "Categories of Information I Expect to Use" go on the strategy sheet, as you can see in Figure 9.1. Finally, after reading, students complete the ***L*** step by writing down what they learned (retrieval practice), then checking to see if they have answered their questions. Students should share answers and perhaps debate any disagreements. Some teachers encourage their students to use the KWL strategy to organize taking notes as they read. Some teachers include an additional stage after the ***W*** step—***H***—how do I find out what I want to know?

METACOGNITIVE DEVELOPMENT FOR SECONDARY AND COLLEGE STUDENTS (LIKE YOU). For older students, teachers can incorporate metacognitive questions into their lessons, lectures, and assignments. For example, before moving on to the next topic, you can simply ask your students to make metacognitive judgments about how effective their study strategies were for the material they just learned. Will they change their approach for the next topic or unit? These kinds of questions encourage *monitoring* and *evaluating* and then *planning* applications for the next task—the three main metacognitive skills. These judgments of

learning can be as effective as frequent retesting, but without the possible negative effects of tests, such as increased student anxiety or extra teacher time required to design, administer, and grade tests (Lee & Ha, 2019).

During lessons, teachers' talk can support student metacognition and learning. In one study, researchers used videos of whole-class lessons to analyze the metacognitive talk of 40 middle school mathematics teachers—20 teachers whose classrooms showed high conceptual growth in math and 20 teachers with low conceptual growth in their classrooms. The metacognitive talk was assessed using a longer version of the guide in Table 9.1. You have seen many of these categories before—different kinds of knowledge; the metacognitive skills of planning, monitoring, and evaluating; and domain-specific versus domain-general focus. The results? High conceptual growth teachers engaged in more metacognitive talk during whole-class lessons, but the significant differences involved more talk in the categories of student personal knowledge ("Raise your hand if you are not sure"), monitoring ("All right, so explain to us what you are doing right now"), evaluating ("Is that true?"), directive style ("Think about that for a minute"), and domain-general frames ("And what else do we know here?). Other kinds of metacognitive talk from Table 9.1 might be helpful in other subjects or lessons (Zepeda et al., 2019).

Metacognition includes knowledge about using many strategies in learning—our next topic.

Table 9.1 Teacher Metacognitive Support

These are the categories and examples of talk that Christina Zepeda and her colleagues observed during middle school math classes on rates, ratios, and proportions.

METACOGNITIVE KNOWLEDGE	
TYPE	**DEFINITION AND EXAMPLES**
Personal Knowledge	Involves knowing about one's knowledge in terms of the basic understanding of the concepts or the problem and themselves as learners. • "… what are your thoughts?" • "Raise your hand if you're not sure."
Strategy Knowledge	Involves how to do an activity or solve a problem (e.g., the steps or formulas). • "How could you determine if these fractions are equivalent?" • "Then what should you do?"
Conditional Knowledge	Involves knowing the constraints of personal and strategy knowledge—knowing the boundaries. Conditional knowledge often includes phrases that examine the "when" or "why." • "Why would you round it up to ninety?" • "Why did you choose four?"
METACOGNITIVE SKILL	
TYPE	**DEFINITION AND EXAMPLES**
Planning	The selection of strategies and resources at the *beginning* of a task or problem. Involves understanding the goals of the task or problem, goal setting, making predictions, or allocating resources prior to working through the task or problem. • "And what should you keep in mind when you set up a proportion?" • "What do you need to do first?"
Monitoring	One's online awareness of comprehension and task performance. Involves assessing one's understanding, strategy use, or task performance during the task or problem. • "Alright, so explain to us what you are doing right now." • "What happened to the units?"
Evaluating	Appraising the outcome and efficiency of one's understanding and performance after completing the task or problem. Involves the analysis of the effectiveness and accuracy of one's performance and strategy use after the task or problem is completed. Sometimes used in response to a student's answer. • "Compare it to what we just did." • "Is that true?"

INSTRUCTIONAL MANNER	
TYPE	**DEFINITION AND EXAMPLES**
Directives	Teacher instructs student(s) to do something or tells student(s) a statement that gets them to think about their thinking/understanding. • "Think about that for a minute." • "Name three ways to solve ratio and rate problems."
Prompting	Teacher asks student(s) a question to get them to think about their thinking/understanding. • "Make sense?" • "What should we do now?"'
Modeling	Teacher demonstrates metacognitive behavior to get the student(s) to think about their own thinking/understanding. • "We understand that a proportion is when you have two fractions that are equal to each other." • "We better check these and see if that holds true or not."
FRAMING	
TYPE	**DEFINITION AND EXAMPLES**
Problem Specific	The instruction is connected to a specific problem. This covers the specific words/numbers/ideas of a problem. • "Wait, where did you get forty from?" • "How do I get from five to twenty-five?"
Problem General	The instruction is being applied to the problem type, not a specific problem. This covers the basic phrases for problem solving without too much detail. • "How are we gonna find the total surface area?" • "This first one, how do we find scale factor?"
Domain General	The instruction might occur while working on a specific problem or type of problem, but the statement is very general and can be applied to different types of problems. A general statement does not have any specific words that denote a type of problem. • "How'd you get that?" • "And what else do I know here?"

Source: Adapted from Zepeda, C. D., Hlutkowsky, C. O., Partika, A. C., & Nokes-Malach, T. J. (2019). Identifying teachers' supports of metacognition through classroom talk and its relation to growth in conceptual learning. *Journal of Educational Psychology, 111*, 522–541.

Learning Strategies

Most teachers will tell you that they want their students to "learn how to learn." Years of research indicate that using good learning strategies helps students learn and that these strategies can be taught (Pressley & Harris, 2006; Schunk, 2020). Using learning strategies and study skills is related to higher grade-point averages (GPAs) in high school and persistence in college (Robbins et al., 2004). But were you taught "how to learn"? Powerful and sophisticated learning strategies and study skills are seldom taught directly until high school or even college, so most students have little practice with them. In contrast, early on, students usually discover repetition and rote learning on their own, so they have extensive practice with these strategies. This may explain why many students cling to flash cards and memorizing—they don't know what else to do.

As you saw in Cluster 8, the way we first learn something greatly influences how readily we remember the information and how appropriately we can apply the knowledge later. First, students must be *cognitively engaged* in order to learn; they have to *focus attention* on the relevant or important aspects of the material. Second, they have to *invest effort*, make connections, elaborate, translate, invent, organize, reorganize, and practice retrieving to think and *process deeply*—the greater the practice and processing, the stronger the learning. Finally, students must *regulate and monitor* their own learning—keep track of what is making sense and notice when a new approach is needed; they must be *metacognitive*. The emphasis today is on helping students develop effective learning

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Learning Strategies (I, A1)

For suggestions about their effective use, take a look at the study skills sites at many colleges—for example, the Sanger Learning Center at the University of Texas (https://ugs.utexas.edu/slc/support). In fact, most colleges and universities have a section on study skills on their websites. See also https://www.educationcorner.com/study-skills.html or search online for "study skills" or "learning strategies."

strategies that *focus attention, invest effort, process information deeply*, and *monitor understanding* (Brown et al., 2014).

Being Strategic About Learning

Learning strategies
A special kind of procedural knowledge—*knowing how* to approach learning tasks.

Learning strategies are a special kind of procedural knowledge—*knowing how* to do something. There are thousands of strategies. Some are general and taught in school, such as summarizing or outlining. Others are specific to a subject, such as using a mnemonic to remember the order of the planets: "My Very Educated Mother Just Served Us Nachos" for Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Other strategies may be unique, invented by an individual to learn Chinese characters, for example. Learning strategies can be cognitive (summarizing, identifying the main idea), metacognitive (monitoring comprehension—do I understand?), or behavioral (setting a timer to work until time's up) (Cantrell et al., 2010). Over time, as you become more expert at using the strategies, you need less intentional effort. Ultimately you may become more automatic in applying the strategies; in other words, the strategies will become your usual way of accomplishing that kind of task—until they don't work and you need new strategies.

Researchers have identified several important principles about teaching learning strategies:

1. Students must be exposed to a number of different strategies, not only general learning strategies but also very specific strategies for particular subjects, such as the visual strategies described later in this section.
2. Students should be taught self-regulatory (conditional) knowledge about *when, where*, and *why* to use various strategies. Although this may seem obvious, teachers often neglect this step. A strategy is more likely to be maintained and employed if students know when, where, and why to use it.
3. Students may know when and how to use a strategy but lack the motivation to apply it. Remember, left on their own, many students, adults included, fall back on comfortable but ineffective strategies such as rote memorization, even if they know more effective strategies (Son & Simon, 2012). Several learning strategy programs include a motivational training component.
4. Students need to believe that they can learn new strategies, that the effort will pay off, and that they can "get smarter" by applying these strategies. In other words, they need a growth mindset, discussed in Cluster 12.
5. Students need background knowledge and useful schemas in the area being studied to make sense of learning materials. It will be difficult to find the main idea in a paragraph about *ichthyology*, for example, if you don't know much about fish. So students may need direct instruction in key content knowledge along with strategy training. Table 9.2 summarizes several learning strategies.

DECIDING WHAT IS IMPORTANT. You can see from the first entry in Table 9.2 that learning begins with focusing attention—deciding what is important. But distinguishing the main idea from less important information is not always easy. Often students focus on the "seductive details" or the concrete examples, perhaps because these are more interesting (Morehead et al., 2016; Rey, 2012). You may have had the experience of remembering a joke or an intriguing example from a lecture but not being clear about the larger point the professor was trying to make. Finding the central idea is especially difficult if you lack prior knowledge in an area and if the amount of new information provided is extensive. Teachers can give students practice using signals in texts such as headings, boldfaced words, outlines, or other indicators to identify key concepts and main ideas while avoiding a focus on seductive details (Lorch et al., 2001). Writing summaries is another way to combat the seductive details effect, at least when learning from a science text (Jaeger et al., 2018).

Table 9.2 Examples of Learning Strategies

	EXAMPLES
Planning and Focusing Attention	Setting goals and timetables
	Underlining and highlighting
	Skimming, looking for headings and topic sentences
Organizing and Remembering	Making organizational charts
	Creating flowcharts, Venn diagrams
	Using mnemonics, imagery
	Using analogies to build structures for knowledge (Is what you are learning like a tree? a town? a map?)
Comprehending	Creating concept maps, webs
	Summarizing, outlining, and note taking
	Creating examples
	Explaining to a peer
Cognitive Monitoring	Making predictions
	Identifying what doesn't make sense
Practicing	Using part practice
	Using whole practice
	Using retrieval practice: self-testing and self-questioning
	Using deliberate practice: Clear criteria for excellence, identify discrepancies between current performance and criteria, practice improving, fail, try again.

SUMMARIES. Students have to be taught how to summarize (Byrnes, 1996; Palincsar & Brown, 1984). Jeanne Ormrod (2020) summarizes these suggestions for helping students create summaries. Ask students to:

- Find or create a topic sentence for each paragraph or section.
- Identify big ideas that cover several specific points.
- Find some supporting information for each big idea.
- Delete any redundant information or unnecessary details.

Begin by doing summaries of short, easy, well-organized readings. Introduce longer, less organized, and more difficult passages gradually. Initially it may be useful to provide a scaffold such as: *This paragraph is about* _____ *and* _____. *They are the same in these ways:* _____, *but different in these ways:* _____. Ask students to compare their summaries and discuss what ideas they thought were important and why—they should be sure to provide evidence.

Two other study strategies that are based on identifying key ideas are underlining texts and taking notes.

Stop & Think How do you make notes as you read? Look back over the past several pages of this cluster. Are my words highlighted in yellow or pink? Are there marks or drawings in the margins, and if so, do the notes pertain to the cluster, or are they grocery lists and doodles?

UNDERLINING AND HIGHLIGHTING. Do you underline or highlight key phrases in textbooks? Underlining and highlighting are probably two of the most frequent but ineffectively used strategies among college students. One common problem is that students underline or

highlight too much, and students who highlight a lot generally learn less. So think carefully about why you are highlighting a particular passage and justify your choices to yourself. Then when you reread, consider those questions again—why did I highlight this? Why is it important? Asking yourself those questions stimulates two powerful learning processes: deeper processing and retrieval practice (Yue et al., 2015). In addition to being selective, you also should actively transform the information into your own words as you underline. Don't rely on the words of the book. Note connections between what you are reading and other things you already know. Draw diagrams to illustrate relationships. Finally, look for organizational patterns in the material, and use them to guide your underlining or highlighting.

TAKING NOTES. Over 95% of college students say they take notes during lectures. Reviewing those notes is a popular exam prep strategy (Morehead et al., 2019). But taking good lecture notes is not an easy task. You have to hold the lecture information in working memory; select, organize, and transform the important ideas and themes before the information "falls off" your working memory workbench; and write down the ideas and themes—all while you are still following the lecture. As you fill your notebook with words and try to keep up with a lecturer, you may wonder if taking notes makes a difference. It does if the strategy is used well. Let's see what the research says (Bui et al., 2013; Kobayashi, 2005; Morehead et al., 2019).

- Taking notes focuses attention during class. Of course, if taking notes distracts you from actually listening to and making sense of the lecture, then note taking may not be effective.
- Taking organized notes makes you construct meaning from what you are hearing, seeing, or reading, so you elaborate, translate into your own words, retrieve, and remember. Even if students don't review notes before a test, taking them in the first place appears to aid learning, especially for those who lack prior knowledge in an area.
- Notes provide extended external storage that allows you to return and review. Students who use their notes to study tend to perform better on tests, especially if they take many high-quality notes—more is better as long as you are capturing key ideas, concepts, and relationships, not just intriguing "seductive" details.
- Expert students match notes to their anticipated use and modify strategies after tests or assignments; use personal codes to flag material that is unfamiliar or difficult; fill in holes by consulting relevant sources (including other students in the class); and record information verbatim only when a verbatim response will be required. In other words, they are *strategic* about taking and using notes.

Even with these advantages, taking well-organized notes that capture the important ideas in a lecture is easier for students with better working memory abilities. When students have more limited working memories, they might need to focus on understanding the teacher and transcribing as much as possible on their laptops, as long as they are fast typists. But beware, the research on taking notes in class on a laptop is not too encouraging because there are so many distractions available on these devices. In fact, when observers monitored students taking notes on laptops, they found that the students were on task *only about 37% of the time*—lots of social media and shopping instead! And classes that *don't allow* computers report higher final exam scores compared to classrooms that allow computers. But if students can avoid the distractions and just capitalize on the note-taking function of a laptop, then there seems to be little difference in learning between taking longhand and e-notes (Morehead et al., 2019).

Middle school and high school students with learning disabilities who use a strategic note-taking form recall and understand significantly more key ideas from science lectures than students in control groups who used conventional note-taking methods (Boyle, 2010a, 2010b; Boyle & Weishaar, 2001). Go to http://www.ldonline.org and search "note taking" for ideas and examples. Figure 9.2 is a general form that can be used in many note-taking

Figure 9.2 A Form for Taking Notes More Strategically

Topic:	What do I already know about this topic?
Key Points/ Key Terms	Notes
Summaries: Write 3 to 5 sentences that capture the main ideas. 1. 2. 3. 4. 5.	
Questions: What is still confusing or unclear?	

Source: Based on ideas from Pauk, W., & Owens, R. J. Q. (2014). *How to study in college* (11th ed.). (Original work published 1962). Boston, MA: Cengage Learning; and http://lsc.cornell.edu/LSC-Resources/cornellsystem.pdf.

situations. Dividing up the page is an idea from Cornell notes, devised by Walter Pauk of Cornell University, who wrote the classic guide *How to Study in College* in the 1950s. It is still available (Pauk & Owens, 2014). This form could be useful for any student who needs extra guidance in note taking.

Visual Tools for Organizing

To use underlining and note taking effectively, you must identify main ideas. In addition, you must understand the organization of the text or lecture—the *connections and relationships among ideas*. There are visual strategies to help students with this key organizational element (Van Meter, 2001). **Concept maps** are graphical tools for organizing and representing knowledge and relationships within a particular field or on a given topic (Hagemans et al., 2013; van der Meij, 2012). Figure 9.3 on the next page is a concept map of a website for creating concept maps from the Institute for Human and Machine Cognition Cmap tools. You may have referred to these interconnected ideas as *webs*.

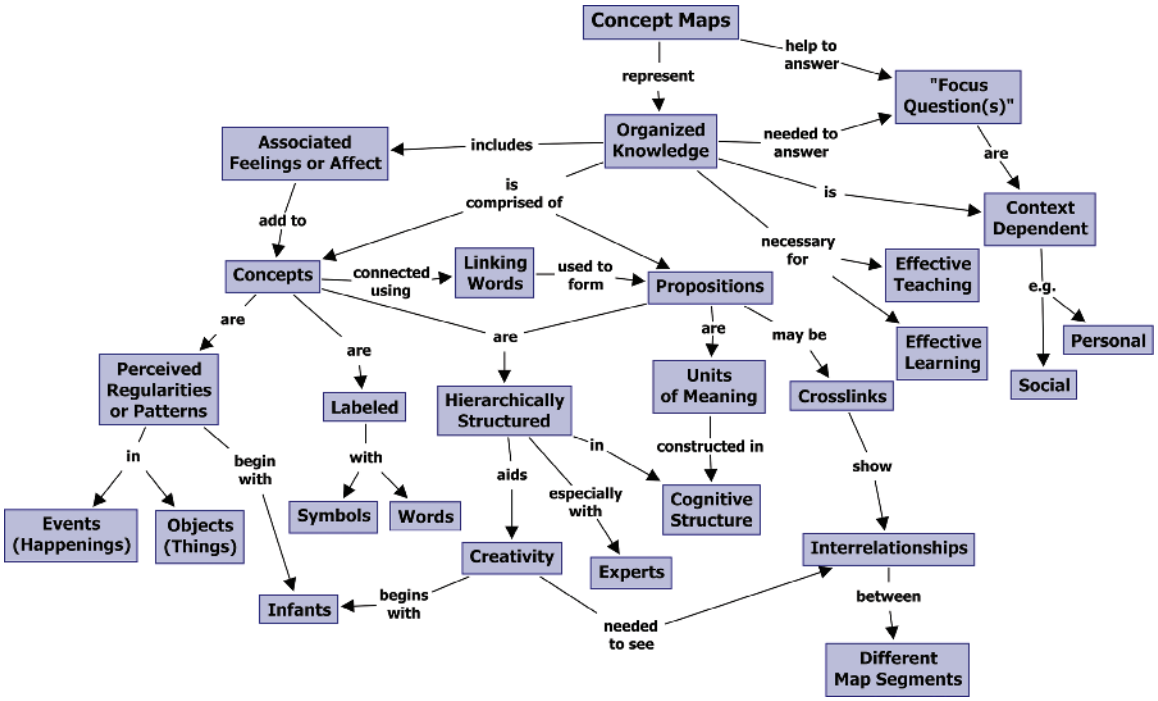
One of my doctoral students at Ohio State even used **Cmaps**, the free downloadable tools from the website shown in Figure 9.3, to plan his dissertation and organize all the readings for his doctoral examinations. Computer Cmaps can be linked to the Internet, and students in different classrooms and schools all over the world can collaborate on them.

Concept map
A drawing that charts the relationships among ideas.

Cmaps
Tools for concept mapping developed by the Institute for Human and Machine Cognition that are connected to many knowledge maps and other resources on the Internet.

Figure 9.3 A Concept Map Showing What a Concept Map Is

This example is taken from Cmap. At this site, you can download concept mapping tools to construct, share, and criticize knowledge on any subject: cmap.ihmc.us.



Source: Institute for Human and Machine Cognition Cmap Tools. (2014). Retrieved from http://cmap.ihmc.us/docs/conceptmap.php. Reprinted with permission from the IHMC.

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Concept Mapping (II, A2)

For advice and additional information about the creation and use of concept maps, go to the website Graphic Organizers (graphic.org/concept.html).

Students should compare their filled-in "maps" and explain the differences in their thinking to each other; explanation is another good study strategy that encourages deeper processing and *retrieval practice*—a powerful learning strategy, as you will see soon.

Noah Schroeder and his colleagues (2018) analyzed 63 studies over 42 years with students from fourth grade to graduate school. Results of those studies showed that using concept maps was more effective than many other instructional approaches for a wide range of grade levels and academic subjects. Having students "map" relationships by noting causal connections, comparison/contrast connections, and examples improves recall. But like anything else, you have to teach students how to create useful concept maps using relationship links like those in Figure 9.3—modeling and feedback are key to teaching here too (Roessger et al., 2018).

Instructor-provided maps can serve as guides for studying. Mieke Hagemans and her colleagues (2013) found that color-coded concept maps helped high school physics students master complex concepts. The concept maps were part of a computer program. The maps changed color as the students completed study in that section of the map, so students had a scaffold to guide them through the reading and assignments and even remind them, for example, that they had not spent enough time on the assignments on "acceleration" in their study of "velocity."

Finally, concept maps can be an effective form of practice. After reading some text or hearing a lecture, review the key ideas by drawing a concept map to represent the information (Blunt & Karpicke, 2014). There are other ways to visualize relationships among concepts, such as Venn diagrams showing how ideas or concepts overlap, and tree diagrams, which show how ideas branch off each other. Timelines organize information in sequence and are useful in classes such as history or geology (Rau, 2020).

Drawing as a learning strategy has sparked quite a bit of research lately. Students read a text or complete a lesson and then draw their understanding of the key concepts they have studied. Drawing strategies often are used in science or mathematics—students might

be prompted to "draw what comes to mind when you think about an atom" (Wu & Rau, 2018, p. 94). This encourages students to think about their own mental models, not just a picture they saw in a text. Then they have to identify, organize, and integrate what they know about atoms and imagine a visual representation. Finally, they have to externalize their understanding—actually make the drawing on paper. Drawing can be more effective than writing a summary or rereading the text. It is especially helpful to make a drawing and explain it to peers—combing two good learning strategies, drawing and explanation (Fiorella & Kuhlmann, 2020). And drawing can support memory—not too surprising when you think about the dual coding theory of memory. Information that is coded both as words and as images is easier to remember (Paivio, 2006).

Drawing is most effective under certain conditions. First, student drawing is best suited to learning from scientific texts that describe complex spatial relationships. Making poor or inaccurate drawings doesn't help learning, so students need good instructional support and feedback. You may have to train students how to capture key elements and relationships in drawings or give students "starter drawings"—partially completed drawings they can finish and finally compare to an illustration you created. Next students can revise their drawings to clear up misconceptions and then share their drawings with other students. If a really good illustration is already available, it might make more sense to have students explain the illustration to themselves or others rather than take the time to do their own drawing, especially if the students focus more on the artistic qualities than the meaning of the drawing (Fernandes et al., 2018; Fiorella & Zhang, 2018; Schmidgall et al., 2019).

Retrieval Practice: Powerful but Underused

One of the most powerful learning strategies is **retrieval practice**, also called the **testing effect** or *active retrieval* (Pashler et al. 2007). You first met this concept in Cluster 8 when we discussed "Teaching for Long-Lasting Knowledge." In study after study over decades, researchers found that trying to actively recall key ideas from readings—testing yourself about what you read or heard in lectures—has proved much more effective than rereading the material or many other ways of studying. And the effect is evident for young children through college students (Dunlosky et al., 2013; Fazio & Marsh, 2019; Lyle et al., 2020). To benefit from this powerful strategy, students can practice recalling what they have learned by listing key ideas, drawing concept maps, explaining to a friend, teaching another student, completing at KWL worksheet, taking a self-test, or anything else that requires active retrieval of the knowledge. Frequent tests and quizzes, even ungraded ones, are a form of retrieval practice. Unfortunately, these strategies are seldom used, in part because students don't enjoy them. One study of college students found (again) that active retrieval was more effective than rereading in learning from a passage about Salvador Dalí, but the students still preferred rereading (Clark & Svinicki, 2015).

Retrieval practice/Testing effect

Practicing by retrieving information from memory instead of rereading or restudying—more effective because retrieval seems to help memories consolidate in the brain and strengthens the neural pathways so the knowledge is easier to find later.

Reading Strategies

As we saw earlier, effective learning strategies should help students *focus attention, invest effort* (connect, elaborate, translate, organize, summarize) so they *process information deeply, monitor* their understanding, then cement learning through *retrieval practice*. A number of strategies support these processes in reading. Many strategies use mnemonics to help students remember the steps involved. For example, one strategy that can be used with younger, elementary-age students or students without much experience in reading textbooks is **PARS**:

P Preview the material to identify the main ideas by scanning the introductory paragraph, headings, visual aids such as tables or graphs, and the summary section.

A Ask yourself questions that relate to the main ideas.

R Read the chapter and try to find answers to your questions.

S Summarize the main ideas in your own words. (Friend & Bursuck, 2019)

PARS

A four-step reading strategy: *Preview* the material to identify main ideas; *Ask* questions related to the main idea; *Read* the chapter to find answers to your questions; *Summarize* the main ideas in your own words.

CAPS
A strategy that can be used in reading literature: *Characters, Aim of story, Problem, Solution.*

A strategy that can be used in reading literature is **CAPS**:

C Who are the characters?
A What is the aim of the story?
P What problem happens?
S How is the problem solved?

These strategies are effective for several reasons. First, following the steps makes students more aware of the organization of a given chapter. How often have you skipped reading headings entirely and thus missed major clues about the way the information was organized? Next, these steps require students to study the chapter in sections instead of trying to learn all the information at once. This makes use of *distributed practice*. Answering questions about the material forces students to process the information more deeply.

Can teaching your whole class to apply reading strategies be effective? A meta-analysis of 52 studies from grades 3 to 12 concluded that such whole-class instruction helped younger students (grades 3 to 8) improve their comprehension of texts but older students did not benefit. For the younger group, setting reading goals was the most useful component of reading strategy instruction. The researchers concluded that teachers should "make their students think and be aware of their purpose for reading and ask questions that elicit such awareness" (Okkinga et al., 2018, p. 1234). Asking questions is a major part of the PARS strategy. No matter what strategies you use, students have to be taught how to use them. *Direct teaching*, *explanation*, *modeling*, and *practice with feedback* are necessary and are especially important for students with learning challenges and students whose first language is not English.

Applying Learning Strategies

Production deficiency
Students learn problem-solving strategies but do not apply them when they could or should.

One of the most common findings in research on learning strategies involves **production deficiencies**. Students learn strategies but do not apply them when they could or should (Schunk, 2020; Son & Simon, 2012). This is especially a problem for students with learning disabilities. For these students, metacognitive strategies such as planning, organizing, monitoring progress, and making adaptations often are underdeveloped (Hallahan et al., 2019). To ensure that students actually use the strategies they learn, several conditions must be met.

APPROPRIATE TASKS. First, of course, the learning task must be *appropriate*. Why would students use more complex learning strategies when the task set by the teacher is to "learn and return" the exact words of the text or lecture? With these tasks, teachers reward memorizing, and the best strategies involve distributed practice and perhaps mnemonics (described in Cluster 8). But hopefully, contemporary teachers use few of these kinds of tasks, so if the task is *understanding*, not memorizing, what else is necessary?

VALUING LEARNING. The second condition for using sophisticated strategies is that students must *care* about learning and understanding and believe learning strategies will help them reach those goals (Zimmerman & Schunk, 2001). I was reminded of this in my educational psychology class one semester when I enthusiastically shared an article about study skills from the newspaper *USA Today*. The gist of the article was that students should continually revise and rewrite their notes from a course so that by the end, all their understanding could be captured in one or two pages. Of course, the majority of the knowledge at that point would be reorganized and connected well with other knowledge. "See," I told the class, "these ideas are real—not just trapped in texts. They can help you study smarter in college." After a heated discussion, one of the best students said in exasperation, "I'm carrying 18 hours—I don't have time to *learn* this stuff!" She did not believe that her goal—to survive the 18 hours—could be reached by using time-consuming study strategies, and she might have been right.

Table 9.3 Teaching Strategies for Improving Students' Metacognitive Knowledge and Skills

These eight guidelines taken from Pressley and Woloshyn (2000) should help you in teaching any metacognitive strategy.

- Teach a few strategies at a time, intensively and extensively as part of the ongoing curriculum.
- Model and explain new strategies.
- If parts of the strategy were not understood, model again and re-explain strategies in ways that are sensitive to those confusing or misunderstood aspects of strategy use.
- Explain to students where and when to use the strategy.
- Provide plenty of practice, using strategies for as many appropriate tasks as possible.
- Encourage students to monitor how they are doing when they are using strategies.
- Increase students' motivation to use strategies by heightening their awareness that they are acquiring valuable skills—skills that are at the heart of competent functioning.
- Emphasize reflective processing rather than speedy processing; do everything possible to eliminate high anxiety in students; encourage students to shield themselves from distractions so they can attend to academic tasks.

Source: Based on Pressley, M., & Woloshyn, V. (2000). *Cognitive strategy instruction that really improves children's academic performance* (2nd ed.). Cambridge, MA: Brookline Books.

EFFORT AND EFFICACY. My student also was concerned about effort. The third condition for applying learning strategies is that students must believe the effort and investment required are reasonable, given the likely return (Winne, 2001). And of course, students must believe they are capable of using the strategies; they must have self-efficacy for using the strategies to learn the material in question (Schunk, 2020). This is related to another condition: Students must have a base of knowledge and/or experience in the area. No learning strategies will help students accomplish tasks that are completely beyond their current understandings.

Reaching Every Student: Teaching How to Learn

Michael Pressley and Vera Woloshyn (2000) developed the Cognitive Strategies Model as a guide for teaching students to improve their metacognitive strategies. Table 9.3 describes the steps in teaching these strategies.

There is an order for developing learning strategies. First, focus on skills that help students take in surface-level knowledge such as highlighting and note taking. Then help student combine, consolidate, and remember knowledge through strategies such as retrieval practice and self-testing. Finally, focus on deep learning by teaching students how to select the right strategy for learning goals and self-monitor their understanding. In addition, embed these strategies into teaching the subject, not just as stand-alone skills (Bernacki et al., 2020).

Module 28 Summary

Metacognition (pp. 375–379)

What is metacognition? Metacognition consists of higher-order knowledge and skills—*knowledge* about our own information-processing capabilities, the thinking and learning tasks we face, and the strategies needed. The three metacognitive *skills* used to regulate thinking and learning are planning, monitoring, and evaluating. *Planning* involves deciding how much time to give to a task, which strategies to use, how to start, and so on. *Monitoring* is the real-time awareness of "how I'm doing." *Evaluating* involves making judgments about the processes and outcomes of thinking and learning and acting on those judgments.

What are some sources of individual differences in metacognition? Individual differences in metacognition may result from different paces of development (maturation) or biological differences among learners. Even very young children have implicit metacognitive systems to help

them learn to evaluate and regulate their behavior, but children are around 5 to 7 years old before they have explicit metacognitive knowledge and skills that can improve throughout school.

How can teachers help students develop metacognitive knowledge and skills? With younger students, teachers can help students "look inside" to identify what they can do to read, write, or learn better. Systems such as KWL can help, if teachers demonstrate, explain, and model the strategy. For older students, teachers can build self-reflective questions into assignments and learning materials as well as support metacognitive development with teacher talk and questions that teach and encourage metacognitive knowledge and skills.

Learning Strategies (pp. 379–387)

What are learning strategies? Learning strategies are a special kind of procedural knowledge—*knowing how* to do something. A strategy for learning might include mnemonics to remember key terms, skimming to identify the organization, and then writing answers to possible essay questions. Use of strategies and tactics reflects metacognitive knowledge.

What key functions do learning strategies play? Learning strategies help students become cognitively engaged—focus attention on the relevant, important aspects of the material. Second, they encourage students to invest effort, make connections, elaborate, translate, organize, and reorganize to think and process deeply; the greater the practice and processing, the stronger the learning. Finally, strategies help students regulate and monitor their own learning—keep track of what is making sense and notice when a new approach is needed.

Describe some procedures for developing learning strategies. Expose students to a number of different strategies, not only general learning strategies but also very specific tactics, such as writing summaries, highlighting and note taking, graphic strategies (concept mapping, drawing, etc.). Teach conditional knowledge about when, where, and why to use various strategies. Develop motivation to use the strategies and tactics by showing students how their learning and performance can be improved. Provide direct instruction in content knowledge needed to use the strategies.

What is retrieval practice? This learning strategy is also called the *testing effect* or *active retrieval* and is more powerful than restudying. To benefit from this powerful strategy, students can practice recalling what they have learned by listing key ideas, drawing concept maps, explaining to a friend, teaching another student, completing a KWL worksheet, taking a self-test, or anything else that requires active retrieval of the knowledge. Frequent tests and quizzes, even ungraded ones, are a form of retrieval practice.

When will students apply learning strategies? If they have appropriate strategies, students will apply them if they are faced with a task that requires good strategies, value doing well on that task, think the effort to apply the strategies will be worthwhile, and believe that they can succeed using the strategies. Also, to apply deep processing strategies, students must assume that knowledge is complex and takes time to learn and that learning requires their own active efforts.

MODULE 29 Problem Solving and Expertise

Learning Objective 9.3 Explain the processes involved in problem solving and the factors that can interfere with successful problem solving.

Connect and Extend to PRAXIS II®

Problem Solving (II, A1)

Be prepared to identify the steps in the general problem-solving process. Describe the techniques that students can employ to build useful representations of problems.

Problem Solving

Put Yourself In My Place. You're interviewing with the district superintendent for a position as a school psychologist. The superintendent is known for his unorthodox interview questions. He hands you a pad of paper and a ruler and says, "Tell me, what is the exact thickness of a single sheet of paper?"

The *Put Yourself in My Place* is a true story. I was asked the paper thickness question in an interview years ago. The answer was to measure the thickness of the entire pad and divide by the number of pages in the pad. I got the answer and the job, but what a tense moment that was. I suppose the superintendent was interested in my ability to solve problems—under pressure!

A **problem** exists when you are searching for a path to reach a goal. Problem solvers often have to set and reach subgoals as they move toward the final solution. For example, if your goal is to drive to the beach, but at the first stop sign you skid through the intersection, you may have to reach a subgoal of fixing your brakes before you can continue toward the original goal (Anderson, 2020). Also, problems can range from *well structured* to *ill structured*, depending on how clear-cut the goals are and how much structure is provided for solving them. Most arithmetic problems are well structured, but finding the right college major or career is ill structured—many different solutions and paths to solutions are possible. Life presents many ill-structured problems (Belland, 2011).

Problem
Any situation in which you are trying to reach some goal and must find a means to do so.

Problem solving is usually defined as formulating new answers, going beyond the simple application of previously learned rules to achieve a goal. Problem solving is what happens when no solution is obvious—when, for example, you can't afford new brakes for the car that skidded on the way to the beach. Some psychologists suggest that much of human learning involves problem solving and that helping students become better problem solvers is one of education's greatest challenges (J. R. Anderson, 2020; Greiff et al., 2013).

Problem solving
Creating new solutions for problems.

There is a debate about problem solving. Most psychologists believe that effective problem-solving strategies are specific to the problem area. For example, the problem-solving strategies in mathematics are unique to math; the strategies in art are unique to art, and so on (Tricot & Sweller, 2014). The other side of the debate claims that there are some general problem-solving strategies that can be useful in many areas such as using *analogical reasoning* or *means-ends analysis* (discussed later).

There is evidence for the value of both general and specific strategies. In everyday life, people appear to move between general and specific approaches, depending on the situation and their level of expertise. Early on, when we know little about a problem area or domain, we can rely on general learning and problem-solving strategies to make sense of the situation. As we gain more domain-specific knowledge (particularly *procedural knowledge* about how to do things in the domain), we consciously apply the general strategies less and less; our problem solving becomes more automatic. So for expert problem solvers in an area, domain-specific skills are the most important (Bokosmaty et al., 2015; Tricot & Sweller, 2014).

A key first step in any problem-solving situation is identifying that a problem exists (and perhaps treating the problem as an opportunity).

Identifying: Problem Finding

Problem identification is not always straightforward. I am reminded of a story about tenants who were angry because the elevators in their building were slow. Consultants hired to "fix the problem" reported that the elevators were no worse than average and improvements would be very expensive. One day, as the building supervisor watched people waiting impatiently for an elevator, he realized that the problem was not slow elevators but the fact that people were bored; they had nothing to do while they waited. When the boredom problem was identified and seen as an opportunity to improve the "waiting experience," the simple solution of installing a mirror by the elevator on each floor eliminated complaints. Today people would just pull out their smartphones to deal with the boredom!

Even though problem identification is a critical first step, research indicates that people often "leap" to naming the first problem that comes to mind ("the elevators are

too slow!"). Experts in a field are more likely to spend time carefully considering the nature of the problem (Bruning et al., 2011). Finding a solvable problem and turning it into an opportunity is the process behind many successful inventions, such as the ballpoint pen, garbage disposal, appliance timer, alarm clock, self-cleaning oven, and thousands of others.

Once a solvable problem is identified, what next?

Defining Goals and Representing the Problem

Let's take a real problem: The machines designed to pick tomatoes are damaging the tomatoes. What should we do? If we represent the problem as a faulty machine design, then the goal is to improve the machine. But if we represent the problem as a faulty design of the tomatoes, then the goal is to develop a tougher tomato. The problem-solving process follows two entirely different paths, depending on which representation and goal are chosen (Nokes-Malach & Mestre, 2013). To represent the problem and set a goal, you have to *focus attention* on relevant information, *understand the words* of the problem, and *activate the right schema* to understand the whole problem.

Stop & Think If you have black socks and white socks in your drawer, mixed in the ratio of four to five, how many socks will you have to take out to make sure you have a pair the same color? (Adapted from Sternberg & Davidson, 1982)

FOCUSING ATTENTION ON WHAT IS RELEVANT. Representing the problem often requires finding the relevant information and ignoring the irrelevant details. For example, what information was relevant in solving the sock problem in *Stop & Think*? Did you realize that the information about the four-to-five ratio of black socks to white socks is irrelevant? As long as you have only two different colors of socks in the drawer, you will have to remove only three socks before two of them match.

UNDERSTANDING THE WORDS. The second task in representing a problem is understanding the meaning of the words, sentences, and factual information in the problem. What words must students know in the following problem?

> In a factory, 54,650 parts were made. When they were tested, 4% were found to be defective. How many parts were working?

Students have to know what *defective* means and that it is the opposite of *working*. They also have to understand that % is the symbol for *percent*. It helps to know what *parts* are in this context (not parts of a whole) and what a *factory* does (Woodward et al., 2018).

To be sure your students understand, you might have to make language substitutions. For example, if a problem includes the 1970s term "shag carpet," the teacher might say, "Can we use other words or just the word *carpet* in this problem to make it easier to understand?" (Woodward et al., 2018, p. 13). You can even enlist the students' help in identifying more familiar language: "The problem talks about lacrosse. What is a sport you know better?" The lesson for teachers is, don't put language roadblocks in students' way as they try to understand the problem.

UNDERSTANDING THE WHOLE PROBLEM. The third task in representing a problem is to assemble all the relevant information and sentences into an accurate understanding or translation of the total problem. This means that students need to form a conceptual model of the problem—they have to understand what the problem is *really asking* and also assign mathematical operators (addition, division, etc.) to relations among numbers in the problem (Jitendra et al., 2009; K. Lee et al., 2009). You may remember in Cluster 8 the trouble Elizabeth had explaining *why* you invert and multiply in division of fractions. She tried to

make a visual representation of the problem, but her representation actually depicted multiplication of fractions, not division. Here is your chance to represent a whole problem in the *Stop & Think*.

Stop & Think Two train stations are 50 miles apart. At 2 p.m. one Saturday afternoon, two trains start toward each other, one from each station. Just as the trains pull out of the stations, a bird springs into the air in front of the first train and flies ahead to the front of the second train. When the bird reaches the second train, it turns back and flies toward the first train. The bird continues to do this until the trains meet. If both trains travel at the rate of 25 miles per hour and the bird flies at 100 miles per hour, how many miles will the bird have flown before the trains meet? (Posner, 1973)

Your interpretation of the problem is called a *translation* because you translate the problem into a schema that you understand. If you translate this as a *distance* problem (activate a distance schema) and set a goal ("I have to figure out how far the bird travels before it meets the oncoming train and turns around, then how far it travels before it has to turn again, and finally add up all the trips back and forth"), then you have a very difficult task on your hands, one that would clearly tax your working memory. But there is a better way to structure the problem. You can represent it as a question of *time* and focus on the time the bird is in the air. The solution could be stated like this:

> The trains are going the same speed so they will meet in the middle, 25 miles from each station. This will take 1 hour because they are traveling 25 mph. In an hour, the bird will cover 100 miles because it is flying at 100 miles per hour. Easy!

Research shows that students can be too quick to decide what a problem is asking. Once a problem is categorized—"Aha, it's a distance problem!"—a particular schema is activated. The schema directs attention to relevant information and sets up expectations for what the right answer should look like. For example, if you use a distance schema in the train problem, the right answer looks like adding up many small distance calculations (Kalyuga et al., 2001; Reimann & Chi, 1989).

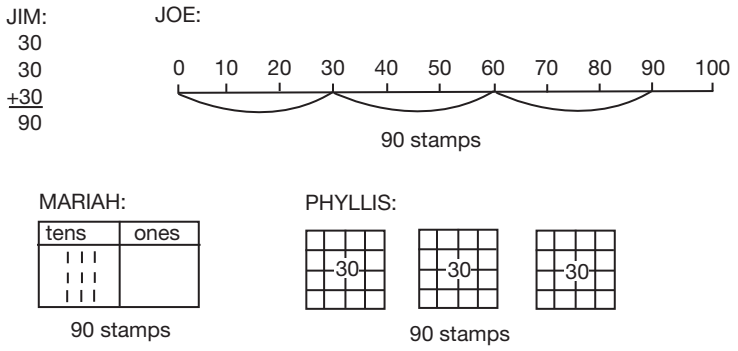
When students lack the necessary schemas to represent problems, they often rely on surface features of the situation and represent the problem incorrectly, like the student who wrote "15 + 24 = 39" as the answer to "Jahana has 15 bonus points, and Veronica has 24. How many more does Veronica have?" This student saw two numbers and the word *more*, so he applied the *add to get more* procedure. Focus on surface features often happens when students are taught to search for key words (*more, less, greater*, etc.), pick a strategy or formula based on the key words (*more* means "add"), and apply the formula. Actually, focusing on surface features gets in the way of forming a conceptual understanding of the whole problem and using the right schema (Fuchs et al., 2014; Van de Walle et al., 2010). When students use the wrong schema, they overlook critical information, use irrelevant information, and may even misread or misremember critical information so that it fits the schema. But when students use the proper schema to represent a problem, they are less likely to be confused by irrelevant information or tricky wording, such as the presence of the word *more* in a problem that really requires *subtraction* (Fenton, 2007).

One way to clarify the whole problem is to draw a representation. Figure 9.4 gives examples of different ways students might represent a simple mathematics problem. Exposure to different ways of representing and solving problems helps develop mathematical understanding.

How can students who lack a good base of knowledge improve their translation and schema selection? To answer this question, we usually have to move to domain-specific problem-solving strategies because schemas are specific to content areas.

Figure 9.4 Four Different Ways to Represent a Problem

A teacher asks, "How many wildlife stamps will Jane need to fill her book if there are three pages and each page holds 30 stamps?" The teacher gives the students supplies such as a piece of graph paper with squares, number lines, and place-value frames and encourages them to think of as many ways as possible to solve the problem. Here are four different solutions, based on four different but correct representations.



Source: Riedesel, C. A. & Schwartz, J. E. (1999). *Essentials of elementary mathematics* (2nd ed.). Reprinted by permission of Pearson Education, Inc. Upper Saddle River, NJ.

TRANSLATION AND SCHEMA TRAINING: DIRECT INSTRUCTION IN REPRESENTING PROBLEMS. For students with little knowledge in an area, teachers can begin by directly teaching how to represent problems thorough demonstration, modeling, visual representations, and "think-alouds." For example, students may need to be taught how to make helpful visual representations. This might involve teachers modeling while they develop one or more representations. Here are some questions you could "think out loud" about to guide the development of visual representations (Woodward et al., 2018):

- What is the problem asking me?
- What kind of problem is this? How do I know?
- What information is relevant to solve this problem and why?
- Does the problem require multiplication or proportions or the Pythagorean theorem or. . . .?
- When I solved this type of problem before, which visual representation did I use?
- How will I represent this new problem?
- What would I do next and why?

Then students practice making their own representations of new problems and sharing with the teacher and each other to get feedback.

The think-aloud demonstration can be followed by providing students with many *worked examples*. In mathematics and physics it appears that in the *early stages* of learning, students benefit from seeing many different kinds of example problems worked out correctly for them. But before we explore worked examples in the next section, a caution is in order. Students with advanced knowledge improve when they solve new problems, not when they focus on already worked examples. Worked examples can actually interfere with the experts' learning because the examples fill working memory space with information the experts already understand and therefore don't need. This has been called the *expert reversal effect* because what works for experts is the *reverse* of what works for beginners (Bichler et al., 2020; Kalyuga & Sweller, 2018).

TRANSLATION AND SCHEMA TRAINING: WORKED EXAMPLES. Worked examples are useful for novices in many subject areas. Why are worked examples effective? Part of the answer is in *cognitive load theory*, discussed in the previous cluster. When students lack specific knowledge in domains—for example, fractions or proportions—they try to solve the problems using general strategies such as looking for key words, applying rote

procedures, or using trial and error. But these approaches put great strain on working memory—there is too much to "keep in mind" all at once. And if you find a solution using trial and error, you often don't know *why* it worked so you haven't learned how to solve similar problems in the future. In contrast, worked examples chunk some of the steps, provide cues and feedback, focus attention on relevant information, and make fewer demands on memory, so the students can use cognitive resources to understand instead of searching randomly for solutions (Wittwer & Renkl, 2010). It is especially useful if the examples focus on the critical features of the problems that students have not yet mastered (Guo et al., 2012).

To get the most benefit from worked examples, however, students have to actively engage—just "looking over" the examples is not enough. This is not too surprising when you think about what supports learning and memory. You need to pay attention, process deeply, and connect with what you already know. Students should explain the examples to themselves. This *self-explanation* component is a critical part of making learning from worked examples active, not passive. In fact, self-explanations can be more effective than explanations from the instructor, probably because learners have to be cognitively engaged to explain to themselves but can zone out during instructor explanations (Bisra et al., 2018).

Examples of self-explanation strategies include trying to predict the next step in a solution, then checking to see if you are right or trying to identify an underlying principle that explains how to solve the problem. Another effective strategy is to have students make a video explaining the worked example to viewers of the video. This was especially effective for students with low prior knowledge of the topic. Making a video means you have to plan, organize, understand, rehearse, and get a bit emotionally invested—all good learning strategies (Hoogerheide et al., 2019). Also, explaining as you study and learn, not waiting to the very end of a reading or study session, supports learning. You can monitor your understanding and reread if necessary before you move on and get more confused (Lachner et al., 2020).

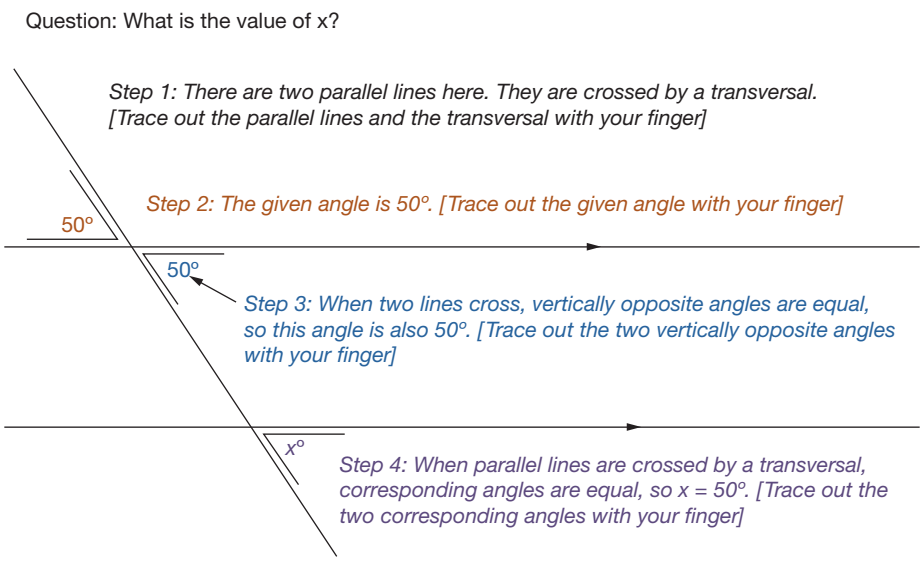
Another way to use worked examples is to have students compare examples that reach a right answer but are worked out in different ways. What is the same about each solution? What is different? Why? (Rittle-Johnson & Star, 2007). Also, worked-out examples should deal with one source of information at a time rather than having students move between text passages, graphs, tables, and so on. The cognitive load will be too heavy for beginners if they have to integrate many sources of information to make sense of the worked examples (Bichler et al., 2020; Bokosmaty et al., 2015). In addition, alternating between studying worked examples and actually solving problems can help students apply and extend what they are learning (Renkl, 2011).

Worked examples can serve as analogies or models for solving new problems. But beware. Without explanations and coaching, novices may remember the surface features of a worked example or case instead of the deeper meaning or the structure. It is the meaning or structure, not the surface similarities, that helps in solving new, analogous problems (Goldstone & Day, 2012). I have heard students complain that the test preparation problems in their math classes were about boats and river currents, but the test asked about airplanes and wind speed. They protested, "There were no problems about boats on the test, and we never studied airplanes in class!" In fact, the problems about wind on the test were solved in exactly the same way as the "boat" problems, but the students were focusing only on the surface features—the type of vehicle.

WORKED EXAMPLES AND EMBODIED COGNITION. If you went to a Montessori school or have studied that curriculum, you know that children in these schools often trace letters made of sandpaper with their fingertips while they learn the phonetic sound of each letter. One explanation for the success of this approach is that these students were using multiple channels—vision, touch, sound, and movement—together to engage with the materials. Also, these students were using *biologically primary* abilities, (pointing and tracing, that have existed for centuries and require little effort) to support the learning of a *biologically secondary* skill, literacy, that is pretty recent in human history and requires

Figure 9.5 Engaging with Worked Examples: Tracing Solutions

When students use multiple channels to engage with worked examples, their learning is better.



Source: Hu, F.-T., Ginns, P., & Bobis, J. (2015). Getting the point: Tracing worked examples enhances learning. *Learning and Instruction, 35*, 85–93, p. 88.

more effort and cognitive load (Tang et al., 2019). Tracing also supports learning from worked examples, perhaps because students use vision, touch, and movement together to connect with the examples. When fifth- and sixth-grade students used their index fingers to trace a diagram of the water cycle, they learned more. This process increased achievement for geometry students as well when they used their fingers to trace worked examples like those in Figure 9.5.

Embodied cognition

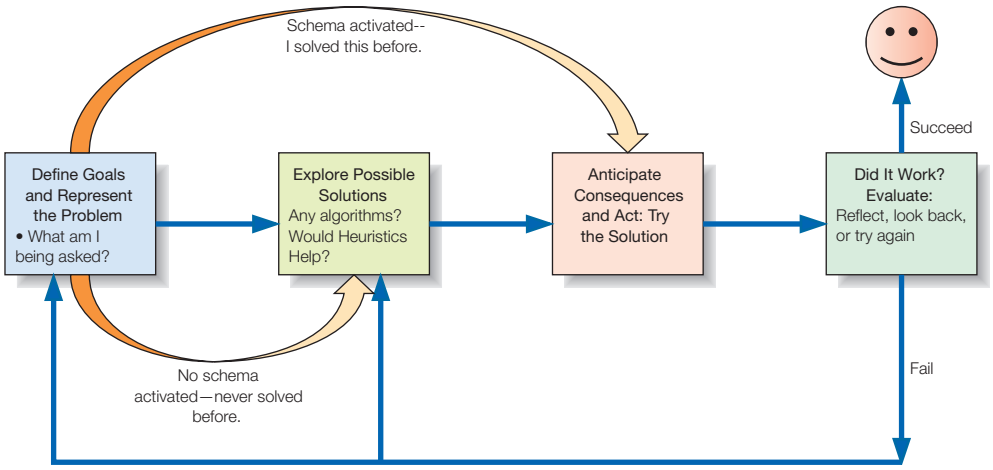
Theory stating that cognitive processes develop from real-time, goal-directed interactions between humans and their environment.

This multichannel tracing approach to engaged learning is consistent with a recent theory called **embodied cognition**, which is based on the assumption that "the way we think about things reflects how our bodies work and interact with objects in the world" (Radvansky & Ashcraft, 2018, p. 37). For example, reading the verb "kick" is likely to activate the area of the brain that controls the feet. In other words, our cognitive processes have deep roots in the interactions of our bodies with the real world—what develops cognitively depends on our sensorimotor engagement with the world. In some ways, this perspective is similar to Piaget's idea that thinking emerges early on from the infant's sensorimotor interaction in the world. Instead of being just simple pathways for outside world sounds and images, our senses and motor responses are central to how we think (Ostarek & Huettig, 2019). So using models, gestures, acting out stories, pointing, tracing, and other kinds of biologically primary actions and movements can support learning of biologically secondary academic skills (Gillies & Rafter, 2020; Novack, & Goldin-Meadow, 2015).

Observational learning is another example. Watching someone perform an action activates the same areas of the brain in observers that would be involved in performing that action themselves—almost as if the brain learns by mentally rehearsing the action. In fMRI research, students studying from worked examples showed greater activation of the brain in the areas associated with math problem solving (the prefrontal and parietal regions). In contrast, studying from verbal directions activated more of the motor and visual regions. But as long as students finally understood the problems, their brain activation during future successful problem solutions looked the same, no matter how they studied. What is learned is more important than how it is learned. If one approach doesn't work, try another way (Lee et al., 2015).

Figure 9.6 The Problem-Solving Process

There are two paths to a solution. In the first, the correct schema is activated and the solution is apparent—the new problem is an old one in disguise. But if no schema works, searching and testing may provide a path to a solution.



THE RESULTS OF PROBLEM REPRESENTATION. The problem representation stage of problem solving has two main outcomes, as shown in Figure 9.6. If your representation of the problem suggests an immediate solution, your task is done. In one sense, you haven't really solved a new problem; you have simply recognized the new problem as a "disguised" version of an old problem that you already knew how to solve. This has been called **schema-driven problem solving**. In terms of Figure 9.6, you can use the schema-activated route and proceed directly to a solution.

Schema-driven problem solving
Recognizing a problem as a "disguised" version of an old problem for which one already has a solution.

But what if you have no existing way of solving the problem or your activated schema fails? Time to search for a solution!

Searching for Possible Solution Strategies

In conducting your search for a solution, you have available two general kinds of procedures: algorithmic and heuristic. Both of these are forms of procedural knowledge (Schraw, 2006).

ALGORITHMS. An **algorithm** is a step-by-step prescription for achieving a goal. It usually is domain specific; that is, it is tied to a particular subject area. In solving a problem, if you choose an appropriate algorithm (e.g., to find the mean, you add all the scores, then divide by the number of scores) and implement it properly, a right answer is guaranteed. Unfortunately, students often apply algorithms unsystematically, trying out one first and then another. They may even happen on the right answer but not understand how they got there, or they may forget the steps they used to find the answer. But many problems cannot be solved by algorithms. What then?

Algorithm
Step-by-step procedure for solving a problem; prescription for solutions.

HEURISTICS. A **heuristic** is a general strategy that might lead to the right answer (Schoenfeld, 2011). Because many of life's problems (careers, relationships, etc.) are not straightforward and have no apparent algorithms, the discovery or development of effective heuristics is important (Korf, 1999). Let's examine a few.

Heuristic
General strategy used in attempting to solve problems.

In **means-ends analysis**, the problem is divided into a number of intermediate goals or subgoals, and then a means of solving each intermediate subgoal is figured out. For example, writing a 20-page term paper can loom as an insurmountable problem for some students. They would be better off breaking this task into several intermediate goals, such as selecting a topic, locating sources of information, reading and organizing the information,

Means-ends analysis
Heuristic in which a goal is divided into subgoals.

making an outline, and so on. As they attack a particular intermediate goal, they may find that other goals arise. For example, locating information may require that they find someone to refresh their memory about using the library computer search system. Keep in mind that psychologists have yet to discover an effective heuristic for students who are just starting their term paper the night before it is due.

Working-backward strategy
Heuristic in which you start with the goal and move backward to solve the problem.

Some problems lend themselves to a **working-backward strategy**, in which you begin at the goal and move back to the unsolved initial problem. Working backward is sometimes an effective heuristic for solving geometry proofs. It can also be a good way to set intermediate deadlines ("Let's see, if I have to submit this cluster in 4 weeks, I should have a first draft finished by the 11th, and that means I better stop searching for new references and start writing by…").

Analogical thinking
Heuristic in which one limits the search for solutions to situations that are similar to the one at hand.

Another useful heuristic is **analogical thinking** (Anderson, 2020; Gentner et al., 2003), which limits your search for solutions to situations that have something in common with the one you currently face. When submarines were first designed, for example, engineers had to figure out how battleships could determine the presence and location of vessels hidden in the depths of the sea. Studying how bats solve an analogous problem of navigating in the dark led to the invention of sonar. Take note, however, that to use analogies effectively, you must focus on meaning and not surface similarities, so focusing on bats' appearance would not have helped solve the communication problem. In fact, using analogies to explain concepts in science can get in the way of understanding if students think they understand the science concept because the analogy is familiar and clear. In one research example, students who studied with analogies did poorest on the topics they thought they understood the best. It might be that the analogies interfered with monitoring their understanding and restudying when necessary because the analogy was easy and understandable. Students have to work at explaining to themselves how the analogy connects to the facts and relationships in the concept they are trying to understand (Wiley et al., 2018).

The possible analogies students bring to the classroom are bound to vary because of their experience and culture. For example, Chinese college students were better at solving a problem of weighing a statue because the problem was similar to their folk tale about how to weigh an elephant (by water displacement). American students were better at solving a problem of finding the way out of a cave (leaving a trail) by using an analogy to Hansel and Gretel, a common European American folk tale (Z. Chen et al., 2004).

Verbalization
Putting your problem-solving plan and its logic into words.

Putting your problem-solving plan into words and giving reasons for selecting it can lead to successful problem solving. You may have discovered the effectiveness of this **verbalization** process accidentally, when a solution popped into your head as you were explaining a problem to someone else. Self-explaining is a kind of verbalization.

Anticipating, Acting, and Looking Back

After representing the problem and exploring possible solutions, the next step is to select a solution and anticipate the consequences. For example, if you decide to solve the damaged tomato problem by developing a tougher tomato, how will consumers react? If you take time to learn a new graphics program to enhance your term paper (and your grade), will you still have enough time to finish the paper?

After you choose a solution strategy and implement it, evaluate the results by checking for evidence that confirms or contradicts your solution. Many people tend to stop working before they reach the best solution and simply accept an answer that works in some cases. In mathematical problems, evaluating the answer might mean applying a checking routine, such as adding to check the result of a subtraction problem. Another possibility is estimating the answer. For example, if the computation was 11×21 the answer should be around 200 because 10×20 is 200. A student who reaches an answer of 2,311 or 32 or 562 should quickly realize these answers cannot be correct. Estimating an answer is particularly important when students rely on calculators or computers because they cannot go back and spot an error in the figures.

Factors That Hinder Problem Solving

Sometimes problem solving requires looking at things in new ways. People may miss out on a good solution because they fixate on conventional uses for materials. This difficulty is called **functional fixedness** (Duncker, 1945). Suppose a screw on a dresser-drawer handle is loose. Will you spend 10 minutes searching for a screwdriver, or will you fix it with a key or a dime?

Functional fixedness
Inability to use objects or tools in a new way.

Another kind of fixation that blocks effective problem solving is **response set**, getting stuck on one way of representing a problem. Try this:

> In each of the four matchstick arrangements below, move only one stick to change the equation so that it represents a true equality such as **V** = **V**.
>
> **V = VII** **VI = XI** **XII = VII** **VI = II**

Response set
Rigidity; the tendency to respond in the most familiar way.

You probably figured out how to solve the first example quite quickly. You simply move one matchstick from the right side over to the left to make **VI** = **VI**. Examples two and three can also be solved without too much difficulty by moving one stick to change the **V** to an **X** or vice versa. But the fourth example (taken from Raudsepp & Haugh, 1977) probably has you stumped. To solve this problem, you must change your *response set* or switch schemas because what has worked for the first three problems will not work this time. The answer here lies in changing from Roman numerals to Arabic numbers and using the concept of square root. By overcoming response set, you can move one matchstick from the right to the left to form the symbol for square root; the solution reads $\sqrt{\mathbf{1}} = \mathbf{1}$, which is simply the symbolic way of saying that the square root of 1 equals 1.

A creative reader of this text emailed some other solutions. Jamaal Allan, then a masters student at Pacific University, pointed out that you could use any of the matchsticks to change the = sign to ≠. Then the last example would be **V** ≠ **II**, or 5 does not equal 2, an accurate statement. He suggested that you also might move one matchstick to change = to < or > and the statements would still be true (but not equalities as specified in the problem above). Bill Wetta, a student at Ashland University, offered another solution that used both Arabic and Roman numerals. You can move one matchstick to make the first **V** an **X**. Then **VI** = **II** becomes **XI** = **II**, or eleven (in Roman numerals) equals 11 (in Arabic numerals). Another creative approach came from Ray Partlow, an educational psychology student in Newark, Ohio. He noted, "Simply remove a matchstick from the V from the left-hand side, and place it directly on top of the I, getting **II** = **II**." Covering one matchstick with another opens up a whole new set of possibilities! Can you come up with any other solutions? Let us know. Be creative!

SOME PROBLEMS WITH HEURISTICS. We often apply heuristics automatically to make quick judgments; that saves us time in everyday problem solving. The mind can react automatically and instantaneously, but the price we often pay for this efficiency may be bad problem solving, which can be costly. Making judgments by invoking stereotypes leads even smart people to make dumb decisions. For example, we might use **representativeness heuristics** to make judgments about possibilities based on our prototypes—what we think is representative of a category. Consider this:

Representativeness heuristic
Judging the likelihood of an event based on how well the events match your prototypes—what you think is representative of the category.

> If I ask you whether a slim, short stranger who enjoys poetry is more likely to be a truck driver or an Ivy League classics professor, what would you say?

You might be tempted to answer based on your prototypes of truck drivers or professors. But consider the odds. With about 10 Ivy League schools and 4 or so classics professors per school, we have 40 professors. Say 10 are both short and slim, and half of those like poetry—we are left with 5. But there are at least 3.5 million truck drivers in the United States. If only 1 in every 5,000 of those truck drivers were short, slim poetry lovers, we would have 700 truck drivers who fit the description. With 700 truck drivers versus 5 professors, it is 140 times more likely that our stranger is a truck driver (Myers & DeWall, 2018).

Availability heuristic
Judging the likelihood of an event based on what is available in your memory, assuming those easily remembered events are common.

Teachers and students are busy people, and they often base their decisions on what they have in their minds at the time—they use the **availability heuristic**. If instances of vivid events come to mind easily, we think they are common occurrences, but that is not necessarily the case; in fact, it is often wrong. For example, after you watch a few TV programs

Belief perseverance
The tendency to hold on to beliefs, even in the face of contradictory evidence.

Confirmation bias
Seeking information that confirms our choices and beliefs while ignoring disconfirming evidence.

during "Shark Week" you may overestimate how many people actually are killed by sharks each year. Data may not support a judgment, but **belief perseverance**, or the tendency to hold on to our beliefs, even in the face of contradictory evidence, may make us resist change.

The **confirmation bias** is the tendency to search for information that confirms our ideas and beliefs. You may have heard the saying "Don't confuse me with the facts." Most people seek evidence that supports their ideas more readily than they search for facts that might refute them. For example, once you decide to buy a certain car, you are likely to notice reports about the good features of the car you chose, not the good news about the cars you rejected. Our automatic use of heuristics to make judgments, our eagerness to confirm what we like to believe, and our tendency to explain away failure combine to generate *overconfidence*. Students usually are overconfident about how fast they can get their papers written; it typically takes twice as long as they estimate (Buehler et al., 1994). In spite of their underestimation of their completion time, they remain overly confident of their next prediction.

The *Guidelines: Applying Problem Solving* give some ideas for helping students become good problem solvers.

GUIDELINES

Applying Problem Solving

Ask students if they are sure they understand the problem.

Examples

1. Can they separate relevant from irrelevant information?
2. What type of problem is it? Can they sort different types of problems into the right categories?
3. Encourage them to visualize the problem by diagramming or drawing it. Are there alternative representations?
4. Ask them to explain the problem to someone else. What would a good solution look like?

Encourage attempts to see the problem from different angles.

Examples

1. Suggest several different possibilities yourself, and then ask students to offer some.
2. Give students practice in taking and defending different points of view on an issue.

Let students do the thinking; don't just hand them solutions.

Examples

1. Offer individual problems as well as group problems, so that each student has the chance to practice.
2. Give partial credit if students have good reasons for "wrong" solutions to problems.
3. If students are stuck, resist the temptation to give too many clues. Let them think about the problem overnight.
4. For complex problems with many interacting elements, give some explicit instructions about how to solve the problems before students jump into the process. As they get better at solving complex problems, skip the explicit instructions (Ashman et al., 2020)

Help students self-monitor and reflect on the problem-solving process (IES, 2018).

Examples

1. Provide a list showing the steps in the problem-solving process, for example:
   - Identify the goals of the problem and the information provided.
   - Identify the problem type.
   - Recall similar problems that could help solve this one.
   - Create a visual representation.
   - Solve the problem and check your solution.
2. Provide a reasonable number of prompts and questions that students can ask themselves, for example, select a few from the following:
   - What is the problem asking?
   - What information is relevant to solve this problem and why?

- When I solved this type of problem before, which visual representation did I use?
- How will I represent this new problem?
- What mathematical operations are involved?
- If I get stuck, can I try a different way?
- Does my solution make sense? How can I verify?

3. Model how to monitor and reflect on the problem-solving process:
   - Answer a few of the prompts out loud and give your reasons.
   - Pick one prompt while reading the problem, one while solving the problem, and one reflecting back on the solution.

Teach heuristics.

Examples

1. Use analogies to solve the problem of limited parking in the downtown area. How are other "storage" problems solved?
2. Use the working-backward strategy to plan a party.

Expert Knowledge and Problem Solving

Most psychologists agree that effective problem solving is based on having an ample store of knowledge about the problem area (Belland, 2011; Schoenfeld, 2011). To solve the matchstick problem, for example, you had to understand Roman and Arabic numbers as well as the concept of square root. You also had to know that the square root of 1 is 1. But what about expertise, really high levels of performance? Let's take a moment to examine what is takes to be an expert.

KNOWING WHAT IS IMPORTANT. Experts know where to focus their attention. For example, expert baseball fans (I am told) pay attention to the moves of the shortstop to learn if the pitcher will throw a fastball, curveball, or slider. But those with little knowledge about baseball may never see the movements of the shortstop unless a hit is headed toward that part of the field (Bruning et al., 2011). In general, experts know what to pay attention to when judging a performance or product such as an Olympic high dive or a prize-winning chocolate cake. To nonexperts, most good dives or cakes look about the same, unless of course they "flop"!

MEMORY FOR PATTERNS AND ORGANIZATION. The modern study of expertise began with investigations of chess masters (De Groot, 1965; Simon & Chase, 1973). Results indicated that masters can quickly recognize about 50,000 different arrangements of chess pieces. They can look at one of these patterns for a few seconds and remember where every piece on the board was placed. It is as though they have a "vocabulary" of 50,000 patterns. Michelene Chi (1978) demonstrated that third- through eighth-grade chess experts had a similar ability to remember chess piece arrangements. For all the masters, patterns of pieces are like words. If you were shown any word from your vocabulary store for just a few seconds, you would be able to remember every letter in the word in the right order (assuming you could spell the word). But a series of letters arranged randomly is hard to remember, as you saw in Cluster 8. An analogous situation holds for chess masters. When chess pieces are placed on a board randomly, masters are no better than average players at remembering the positions of the pieces. The master's memory is for patterns that make sense or could occur in a game. So expertise in chess is based on extensive domain-specific knowledge of possible patterns and moves stored in long-term memory.

A similar phenomenon occurs in other fields such as memory for patterns in electrical circuit diagrams, bridge hands, and computer programming (Anderson, 2020). There may be an intuition about how to solve a problem based on recognizing patterns and underlying principles and knowing the "right moves" for those patterns. For example, when asked to classify physics problems, novices grouped problems based on surface features such as "These are all about inclined planes." Experts grouped problems based on the key principle involved, as in "These problems [which looked entirely different] all involve conservation of energy" (Anderson, 2020).

PROCEDURAL KNOWLEDGE. So we see that experts pay attention to important features and recognize patterns in order to represent a problem very quickly. What else? With the problem

identified, experts know what to do next and they can do it. They have a large store of *productions* or if–then schemas about what action to take in various situations. The steps of understanding the problem and choosing a solution happen simultaneously and fairly automatically (K. A. Ericsson & Charness, 1999). Of course, this means that experts must have many, many schemas available. A large part of becoming an expert is simply acquiring a great store of *domain knowledge* or knowledge that is particular to a field. Experts' rich store of knowledge is elaborated and well-practiced, so that it is easy to retrieve from long-term memory when needed.

Deliberate practice

Becoming expert in a skill that has clear criteria by focusing on the discrepancies between your current skill level and expert performance and working persistently to improve your performance, usually with guidance and feedback from an expert coach.

The right kind of practice is critical. Simple repetition is not enough. This is why golfers or tennis players can play often but never get much better. Developing expert performance requires **deliberate practice**. To engage in deliberate practice, you must be attempting to master a skill that has clear criteria for excellence. Second, you usually need a teacher or coach to analyze your performance and identify the discrepancies between your performance and the criteria for an expert performance. Identifying these discrepancies is the key to deliberate practice—you have to know what to practice. You have to be motivated to learn, receive feedback on your performance, monitor how well your performance matches the criteria for expert performance, and focus your practice on deviations from the criteria to get better. Deliberate practice is difficult, time-consuming, and not much fun (Anderson, 2020; Ericsson & Pool, 2016).

So how long would you have to engage in this deliberate, focused, not-so-much-fun kind of practice to become an expert? In 2008, Malcolm Gladwell cited some of Anders Ericsson's research on expert violinists and created the "ten-thousand-hour rule," stating it takes 10,000 hours of practice to develop expertise. Gladwell was right that is takes a very long time to become an expert, but the time varies by fields, it helps to have some talent, the practice must be deliberate, and no amount of practice will guarantee to make you an expert in any given field. But even if you don't reach world-class levels in a field through practice, you will continue to improve if you continue the right kind of practice (Anderson, 2020; Ericsson & Pool, 2016).

PLANNING AND MONITORING. Experts spend more time analyzing problems, drawing diagrams, breaking large problems down into subproblems, and making plans. A novice might begin immediately—writing equations for a physics problem or drafting the first paragraph of a paper—but experts plan out the whole solution and often make the task simpler in the process. As they work, experts monitor progress, so time is not lost pursuing dead ends or weak ideas (Schunk, 2020). We all can be experts in one area—studying. The *Guidelines: Becoming an Expert Student* provide ideas for you and your students.

GUIDELINES

Becoming an Expert Student

Be clear about your goals in studying.

Examples

1. Target a specific number of pages to read and outline.
2. Write the introduction section of a paper.

Make sure you have the necessary declarative knowledge (facts, concepts, ideas) to understand new information.

Examples

1. Keep definitions of key vocabulary available as you study.
2. Use your general knowledge. Ask yourself, "What do I already know about _____ ?"
3. Build your vocabulary by learning two or three new words a day and using them in everyday conversation.

Find out what type of test the teacher will give (essay, short answer), and study the material with that in mind.

Examples

1. For a test with detailed questions, practice writing answers to possible questions.
2. For a multiple-choice test, use mnemonics to remember definitions of key terms.

Make sure you are familiar with the organization of the materials to be learned.

Examples

1. Preview the headings, introductions, topic sentences, and summaries of the text.
2. Be alert for words and phrases that signal relationships, such as *on the other hand, because, first, second, however, since.*

Know your own cognitive skills and use them deliberately.

Examples

1. Use examples and analogies to relate new material to something you care about and understand well, such as sports, hobbies, or films.
2. If one study technique is not working, try another—the goal is to stay involved, not to use any particular strategy.
3. If you start to daydream, stand up from your desk and face away from your books, but don't leave. Then sit back down and study.

Study the right information in the right way.

Examples

1. Be sure you know exactly what topics and readings the test will cover.
2. Spend your time on the important, difficult, and unfamiliar material that will be required for the test or assignment. Resist the temptation to go over what you already know well, even if that feels good.
3. Keep a list of the parts of the text that give you trouble, and spend more time on those pages.
4. Process the important information thoroughly by using mnemonics, forming images, creating examples, answering questions, making notes in your own words, and elaborating on the text. Do not try to memorize the author's words—use your own.

Monitor your own comprehension.

Examples

1. Use questioning to check your understanding.
2. When reading speed slows down, decide if the information in the passage is important. If it is, note the problem so you can reread or get help to understand. If it is not important, ignore it.
3. Check your understanding by working with a friend and quizzing one another.

Manage your time.

Examples

1. When is your best time for studying? Morning, late night? Study your most difficult subjects then.
2. Study in shorter rather than longer blocks, unless you are really engaged and making great progress.
3. Eliminate time wasters and distractions. Study in a room without a television or your roommate, then turn off your phone and stay off social media—maybe even off the Internet altogether.
4. Use bonus time—take your educational psychology notes to the doctor's office waiting room or laundry room. You will use time well and avoid reading old magazines.

Source: Based on ideas from University of Lynchburg. (2021). *Study tips*. Available at https://www.lynchburg.edu/academics/tutoring-academic-support/top-10-study-skills/; Sanger Study Center. (2021). *Study smart, not hard*. University of Texas and Wong, L. (2015). *Essential study skills* (8th ed.). Cengage.

So what can we conclude? Experts (a) know where to focus their attention; (b) perceive large, meaningful patterns in given information and are not confused by surface features and details; (c) hold more information in working and long-term memories, in part because they have organized the information into meaningful and interconnected schemas and procedures; (d) take a great deal of time to analyze a given problem; (e) have automatic procedures for accomplishing pieces of the problem; (f) are better at monitoring their performance; and (g) have deep, flexible knowledge that applies to new situations (Richey &

Nokes-Malach, 2015). One consequence of developing expertise is that experts forget how difficult it was to learn something and how long it took. As a teacher, you will have to be sensitive about what it means for students to not understand. Sometimes the best teacher is another student who has just mastered the material, not an expert who cannot remember what it was like *to not know*.

When the area of problem solving is fairly well defined and the criteria for excellent performances are clear, such as chess or physics or computer programming, then these characteristics of expert problem solvers hold fairly consistently. In these kinds of domains, even if students do not have the extensive background knowledge of experts, they can learn to approach the problem like an expert by taking time to analyze the problem, focusing on key features, using the right schema, and not trying to force old but inappropriate solutions on new problems (Belland, 2011). But when the problem-solving area is less well defined and has fewer clear underlying principles, such as problem solving in economics or psychology, then the differences between experts and novices are not as clear-cut (Ericsson & Pool, 2016).

Module 29 Summary

Problem Solving (pp. 388–402)

What is problem solving? Problem solving is both general and domain specific. Also, problems can range from *well structured* to *ill structured*, depending on how clear-cut the goal is and how much structure is provided for solving the problem. General problem-solving strategies usually include the steps of *identifying* the problem, *setting goals, searching* for possible solutions, *anticipating* possible consequences, *acting*, and finally *looking back* to evaluate the outcome. Both general and specific problem solving are valuable and necessary.

Why is the representation stage of problem solving so important? To represent the problem accurately, you must understand both the whole problem and its discrete elements. Schema training may improve this ability. The problem-solving process follows entirely different paths, depending on what representation and goal are chosen. If your representation of the problem suggests an immediate solution, the task is done; the new problem is recognized as a "disguised" version of an old problem with a clear solution. But if there is no existing way of solving the problem or if the activated schema fails, then students must search for a solution. The application of algorithms and heuristics—such as means-ends analysis, working backward, analogical thinking, and verbalization—may help students solve problems.

How can worked examples help students develop powerful schemas for problem solving? Worked examples help students manage cognitive load (overload) and avoid inefficient trial-and-error learning. Worked examples chunk some of the steps, provide cues and feedback, focus attention on relevant information, and make fewer demands on memory, so the students can use cognitive resources to understand instead of searching randomly for solutions. To get the most benefit from worked examples, however, students have to actively engage—just "looking over" the examples is not enough. Here, self-explanation and using multiple learning channels (vision, touch, movement, hearing) support engagement.

Describe factors that can interfere with problem solving. Factors that hinder problem solving include functional fixedness or rigidity (response set). These disallow the flexibility needed to represent problems accurately and to have insight into solutions. Also, as we make decisions and judgments, we may overlook important information because we base judgments on what seems representative of a category (representativeness heuristic) or what is available in memory (availability heuristic), then pay attention only to information that confirms our choices (confirmation bias) so that we hold on to beliefs, even in the face of contradictory evidence (belief perseverance).

What are the differences between expert and novice knowledge in a given area? Expert problem solvers have a rich store of declarative, procedural, and conditional knowledge. They organize this knowledge around general principles or patterns that apply to large classes of problems. They work faster, remember relevant information, and monitor their progress better than novices. Developing expert performance requires deliberate practice. To engage in deliberate practice, you must be attempting to master a skill that has clear criteria for excellence. Second, you usually need a teacher or coach

to analyze your performance and identify the discrepancies between your performance and the criteria for an expert performance. One consequence of developing expertise is that experts forget how difficult it was to learn something and how long it took. As a teacher, you will have to be sensitive about what it means for students to not understand.

MODULE 30 Critical Thinking, Transfer, and Complex Learning

Learning Objective 9.4 Identify factors that influence students' abilities to think critically and to form and support arguments.

Learning Objective 9.5 Discuss how, why, and when knowledge learned in one situation might be applied to new situations and problems.

Learning Objective 9.6 Explain what characterizes robust knowledge, how to recognize it, and how teaching can develop robust knowledge.

Critical Thinking and Argumentation

Paul and Elder (2020) define **critical thinking** as "the art of analyzing and evaluating thought processes with a view to improving them" (p. 9). Critical thinking involves intentionally bringing your clearest thinking to shape your beliefs and direct your actions. Virtually every article I read before writing this section began with a claim about how essential critical thinking is today. Critical thinking skills are useful in almost every life situation—even in evaluating the media and political ads that constantly bombard us (Huber & Kuncel, 2016). When you see a group of gorgeous people extolling the virtues of a particular brand of sparkling water as they frolic in skimpy bathing suits, you must decide if sex appeal is a relevant factor in choosing a drink (remember Pavlovian advertising from Cluster 7).

Critical thinking
Evaluating conclusions by logically and systematically examining the problem, the evidence, and the solution.

What Critical Thinkers Do: Paul and Elder's Model

Paul and Elder (2014, 2020; Elder & Paul, 2012) suggest the model in Figure 9.7 on the next page as a way of describing what critical thinkers actually do. As you can see, at the center of critical thinking are *the elements* of reasoning, which entail drawing conclusions based on reasons. But to reason well—to think critically—we should apply *the standards* such as clarity, accuracy, logic, and fairness, as indicated in Figure 9.7. With practice in clear, accurate, logical (etc.) reasoning, we develop *intellectual traits* such as humility, integrity, perseverance, and confidence.

Connect and Extend to PRAXIS II®

Thinking Skills (II, A1)

A nearly universal goal of educational programs across the country is the development of thinking skills. Describe what a teacher can do to cultivate these skills in the classroom. Search for "teaching thinking skills" at edutopia.org for more ideas.

Teaching Critical Thinking

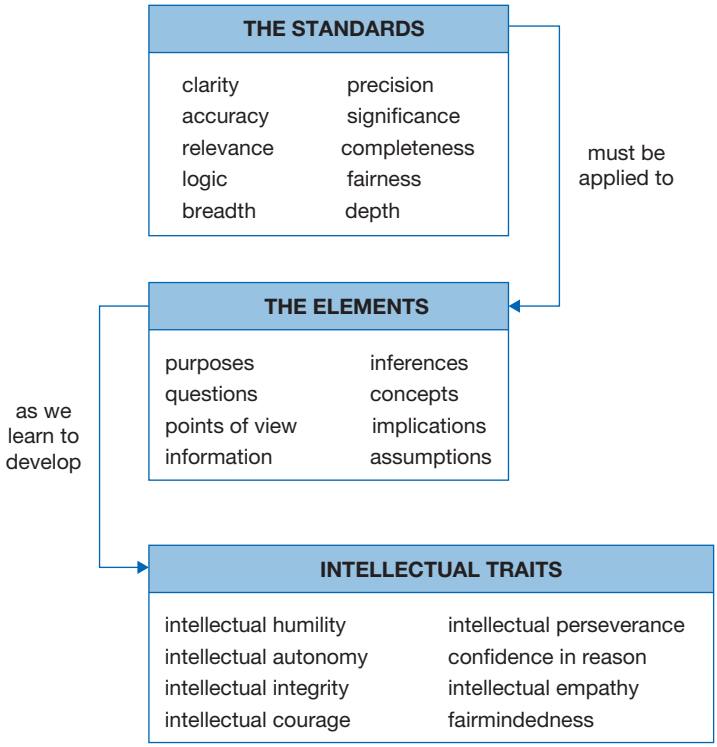
Research results are clear: Critical thinking skills and the dispositions to apply those skills can be taught at all grade levels. So how would you do that in your classes? When Phillip Abrami and his colleagues (2015) analyzed over 340 interventions to teach critical thinking with students ages 6 through adulthood in primary through graduate schools, three elements emerged as effective: dialogue, authentic instruction, and mentorship.

- **Dialogue:** Teachers pose questions and encourage students to dialogue through whole-class and small-group discussion, debates, Socratic dialogue, or written exchanges.
- **Authentic instruction:** Teachers focus the dialogue on problems that make sense to the students using role-plays, simulations, case studies, or ethical dilemmas, for example.
- **Mentorship:** One-to-one mentoring for students from teachers, coaches, or other adults also supports the development of critical thinking.

No matter what approach you use to develop critical thinking, it is important to follow up with additional practice. One lesson is not enough. For example, if your class examined a particular historical document to determine if it reflected bias or propaganda, you should follow up by

Figure 9.7 Paul and Elder's Model of Critical Thinking

Critical thinkers routinely apply the intellectual standards to the elements of reasoning to develop intellectual traits.



Source: Elder, L. & Paul, R. (2012). *Critical thinking: Tools for taking charge of your learning and your life* (3rd ed., p. 58). Upper Saddle River, NJ: Pearson. Reprinted and Electronically reproduced by permission of Pearson Education Inc. Upper Saddle River, New Jersey.

analyzing other written historical documents, contemporary advertisements, social media postings, web search results, or news stories. Unless thinking skills become overlearned and relatively automatic, they are not likely to be transferred to new situations (Mayer & Wittrock, 2006). Instead, students will use these skills only to complete the lesson in social studies, not to evaluate the claims made by friends, websites, politicians, car manufacturers, salespeople, or diet plans.

APPLYING CRITICAL THINKING IN SPECIFIC SUBJECTS. Critical thinking could be useful in any subject. But many critical thinking skills are specific to a particular subject and serve to guide actions in that subject (Huber & Kuncel, 2016). For example, three critical thinking skills for studying history are:

- **Sourcing:** Looking at the source of the document before reading and using that information to help interpret and make inferences about the reading. Is the source biased? Can I trust it?
- **Corroboration:** Making connections between the information in different texts and noting similarities and contradictions.
- **Contextualization:** Understanding the time, place, people, and culture that comprise the context for the event, with all the political and social forces that might be operating.

Jeffrey Nokes and his colleagues (2007) investigated direct teaching of these three history critical thinking skills (versus no skills teaching) and using multiple readings (versus traditional texts). The multiple readings included historical fiction, excerpts from speeches, government documents, photographs, charts and historical data, and short sections from texts. Students who learned with multiple readings instead of traditional textbooks actually learned more history content, with or without applying the critical thinking skills, but the students who were taught and applied critical thinking skills to multiple readings learned the most. These students successfully used two of the three critical thinking skills, *sourcing* and *corroboration*. Contextualization

POINT/COUNTERPOINT: Should Schools Teach Critical Thinking and Problem Solving?

The question of whether schools should focus on process or content, higher-order thinking skills or academic information has been debated for years. Some educators suggest that students must be taught how to think, while other educators assert that students cannot learn to "think" in the abstract. They must be thinking about something—some content. Should teachers focus on content knowledge or critical thinking?

Point

Problem solving and critical thinking can and should be taught. In a special issue of *Educational Psychology Review*, Karen Murphy and her colleagues (2014) made this claim: "Perhaps one of the most important aims of formal education is to equip students with the ability to think critically and analytically about complex topics" (p. 561). This claim is not new, Murphy says. It goes back at least to philosophers before Socrates. But today educators and policy makers argue strongly for investing in programs and practices that teach critical thinking to children and adolescents. Closer to home for you, Peter Facione (2011) claims that critical thinking is related to GPA in college and to reading comprehension. There is evidence that attending college improves general critical thinking skills and dispositions even without specific interventions fostering critical thinking (Huber & Kuncel, 2016).

Counterpoint

Critical thinking and problem-solving skills do not transfer. According to E. D. Hirsch, a vocal critic of critical thinking programs:

> But whether such direct instruction of critical thinking or self-monitoring does in fact improve performance is a subject of debate in the research community. For instance, the research regarding critical thinking is not reassuring. Instruction in critical thinking has been going on in several countries for over a hundred years. Yet researchers found that students from nations as varied as Israel, Germany, Australia, the Philippines, and the United States, including those who have been taught critical thinking continue to fall into logical fallacies. (1996, p. 136)

A focus on general critical thinking skills is wasteful when so many of the important skills are specific to a particular domain and when general critical thinking skills tend to develop on their own (Huber & Kuncel, 2016).

Beware of Either/Or

One clear message from current research on learning is that both subject-specific knowledge and learning strategies are important. Students today need to be critical consumers of all kinds of knowledge, but critical thinking alone is not enough. Students need the knowledge, vocabulary, and concepts to understand what they are reading, seeing, and hearing. The best teachers can teach both math content and how to learn math at the same time and can provide instruction in both history and how to critically assess history sources.

proved more difficult, perhaps because the students lacked the background knowledge to fill in contextual information. So critical thinking for specific subjects can be taught along with the subject, especially if you use the right materials. But as you can see in the *Point/Counterpoint*, educators don't agree about the best way to foster critical thinking in schools.

Thinking Critically About Online Sources

As you just saw, learning with multiple sources can be powerful, especially when students are taught ways to think critically about the information. What about sources from the Internet? As the teacher in the cluster-opening case lamented, not every student naturally

Table 9.4 Evaluating Online Resources

There are many checklists available for evaluating online resources. These guidelines are a good start.

Who? Author
Is the author an expert? Look for credentials, education, degrees, training, titles. Who sponsors the website? Is the sponsor an expert on the topic? Is the author biased? Anonymous? If the author is not named, beware!
Why? What is the motivation of the author?
Is the website trying to inform or explain? Trying to sell you something? Trying to persuade you with propaganda?
Where? Publisher
Is the publisher a scientific or academic journal? A government agency? A reliable news source? Trustworthy websites end in .org, .edu, .gov, or a web address you recognize. Check the contact information or "About Us" section. If the publisher is an organization that wants money or personal information, beware!
When? How old is the post?
When was the information posted? When was it last revised?
Is the information accurate?
Does the website list sources, references, support? Cross check the facts presented on other websites—look for confirmation from many other sources. If there are spelling or grammar errors, beware!

Sources: Based on ideas from https://library.columbia.edu/libraries/undergraduate/evaluating_web.html.; https://guides.lib.berkeley.edu/evaluating-resources; https://www.loc.gov/rr/business/beonline/selectbib.html; and https://www.tech-talk.com/wp-content/uploads/2019/09/cars_website_evaluation_checklist.pdf.

thinks critically about those sources: "If it's on the web, it must be right—right?" Table 9.4 is a checklist for evaluating online sources.

Effectively teaching students how to critically evaluate information from the Internet, or any source for that matter, is not easy. It is more than providing a checklist or set of guidelines. In a study of seventh- and eighth-grade students asked to evaluate online visual representations (charts, graphs, photographs, tables, maps, etc.), very few students mentioned validity or the *trustworthiness of the source* as criteria for judging the images. Students were more likely to judge the images based on whether they were clear or easy to read or provided a large amount of detail (Barzilai & Eilam, 2018). But the critical thinking skill of *evaluating the source* of information is, well, critical (Cho et al., 2017). Researchers had some success in training ninth-grade students to think critically about the source based on three dimensions: the author's position ("who says what"), the author's motivation ("why the author says it"), and the media quality ("where it was published"). The training involved group discussions focusing on pairs of selections from the Internet that contradicted each other. The students used the three dimensions of Who? Why? Where? to guide the discussions. Compared to a control group, the trained students gave lower ratings to less reliable links and increased the number of references they made to reliable sources such as scientific journals. Group discussions of and arguments about students' conflicting ideas were key elements in the intervention—see the next section for more on argumentation. No matter what, students need direct teaching, modeling, and practice with many different assignments to think critically about online sources. Once is never enough—a theme throughout this book. For lesson plans about evaluating online resources, got to https://www.learningforjustice.org and search for "evaluating online resources."

Argumentation

Argumentation
The process of debating a claim with someone else.

The ability to construct and defend a position is essential in mathematics, physical and social sciences, politics, persuasive writing, and critical thinking, to name just a few areas. Both Piaget and Vygotsky would agree that cognitive development is supported by social interactions, dialogue, challenging misunderstandings, and argument. Like critical thinking, **argumentation**—the process of constructing and critiquing arguments—is considered an important 21st-century skill (Asterhan & Schwarz, 2016). For example, learning science means coming to understand and accept "crazy ideas; for instance, the idea that a spinning

Earth causes day and night rather than a moving Sun; the idea that air has mass; or the idea that plants get the majority of their mass from the air" (Osborne et al., 2019, p. 1073). Throughout the history of science, these crazy ideas were accepted only after repeated successful arguments based on evidence. Thus, the Next Generation Science Standards (NGSS) lists *engaging in argument from evidence* as one of the eight key practices that are the goals of science teaching.

TWO STYLES OF ARGUMENTATION. There are two styles of argumentation—*disputative* and *deliberative. Disputative argumentation* is debate. You must support your claims with evidence and understand your opponents' positions so you can successfully refute their claims with evidence. It is a competitive process where the goal is to convince an opponent to switch sides. The basic question is *who* is right. With *deliberative argumentation*, the goal is to collaborate in comparing, contrasting, and evaluating alternatives, then arrive at a constructive conclusion. The basic question is *which idea* is right. Both kinds of argumentation are difficult. Students often concede right away or else they hold on to their initial beliefs without engaging in the argument. But true learning comes with considering, understanding, and refuting arguments and then improving knowledge based on a consideration of the evidence (Asterhan & Babichenko, 2015).

Children are not good at disputative argumentation, adolescents are a bit better, and adults are better still but not perfect. Children don't pay very much attention to the claims and evidence of the other person in the debate. Adolescents understand that their opponent in a debate has a different position, but they tend to spend much more time presenting their own position than they do trying to understand and critique their opponent's claims. It is as if the adolescents believe "winning an argument" means making a better presentation, but they don't appreciate the need to understand and weaken the opponent's claims (Kuhn & Dean, 2004; Nussbaum, 2011). Children and adolescents focus more on their own positions because it is too demanding to remember and process both their own and their opponent's claims and evidence at the same time—the *cognitive load* is just too much. In addition, argumentation skills are not natural. They take both time and instruction to learn (Kuhn et al., 2008; Udell, 2007). Students must learn to plan, evaluate how the plan is going, reflect on what the opponent has said, and change strategies as needed—in other words, use *metacognitive knowledge and skills for argumentation*.

What about deliberative-collaborative argumentation? Christa Asterhan and Baruch Schwartz found that the deliberative approach was better than the disputative method for learning subject matter and for changing beliefs. Maybe the debate style of disputative argumentation focuses students on winning and on how they perform, so they are more resistant to change—and learning often requires change (Asterhan & Schwarz, 2016).

A study by Jonathan Osborne and his colleagues (2019) on professional development for teachers demonstrated the possibilities of deliberative-collaborative argumentation in changing students' argumentation skills. The teachers in the study learned to use six classroom practices to scaffold their students' skill in *engaging in argument from evidence*. The practices were:

1. *Ask:* The teacher asks open-ended questions where the "best" answer is not obvious and conflicting answers from students are likely.
2. *Press:* The teacher encourages students to elaborate on their reasoning—"Tell me more." "Why?" "How do you know?"
3. *Link:* The teacher relates one student response to another to highlight agreements or conflicts.
4. *Claim/Explain:* The students provide extended explanations and support their claims with evidence.
5. *Co-construct:* The students build on each other's ideas, ask other students to elaborate or clarify their ideas.
6. *Critique:* When students learn to respectfully challenge and critique each other's ideas, then the culture of the classroom supports reasoning and critical thinking.

In a classroom where the teacher applies these practices, you would hear students saying things like "OK, I respectfully disagree with… because…." or "I agree with… and also you could add…." The teacher might be saying things like "Be more specific; what exactly…?" or "Who can explain why…?" Another study found that prompting students to consider evidence that was inconsistent with their positions by saying, "Not all of the evidence is going to support your side; if it doesn't, see if you can deal with it" made a big difference in helping students develop their argumentation skills (Iordanou et al., 2019, p. 8). Finally, a meta-analysis of 71 studies of student interaction found that both children and adolescents learn more when they are asked to discuss information and *come to agreement* (Tenenbaum et al., 2020).

LESSONS FOR TEACHERS. It seems that to improve students' debating and persuasion skills, to help them *learn to argue*, disputative argumentation is a good approach. But to learn subject matter, to *argue to learn*, deliberative-collaborative argumentation makes sense. With this approach teachers encourage students to discuss and dispute in order to construct the best understanding based on evidence (Nussbaum, 2020).

Teaching for Transfer

Stop & Think Think back for a moment to one of your high school classes in a subject that you have not studied in college. Imagine the teacher, the room, the textbook. Now remember what you actually learned in class. If it was a science class, what were some of the formulas you learned? Oxidation reduction? Boyle's law?

Connect and Extend to PRAXIS II®

Transfer of Learning

Successful transfer of learning from the school to other contexts is evidence of superior instruction. What can teachers do to optimize transfer of knowledge and skills to the broader world?

If you are like most of us, you may remember *that* you learned these things, but you will not be quite sure exactly *what* you learned. Were those hours wasted? This question relates to the important topic of learning transfer. Let's begin with a definition of *transfer*.

Transfer

Influence of previously learned material on new material; the productive (not reproductive) uses of cognitive tools and motivations.

Whenever something previously learned influences current learning or when solving an earlier problem affects how you solve a new problem, **transfer** has occurred. Shana Carpenter (2012) defines transfer simply as "the application of learned information to novel contexts" (p. 279). If students learn a mathematical principle in one class and use it to solve a physics problem days or weeks later in another class, then transfer has taken place. However, the effect of past learning on present learning is not always positive. Functional fixedness and response set (described earlier in this cluster) are examples of negative transfer because they are attempts to apply *inappropriate* strategies to a new situation.

Transfer has several dimensions (Barnett & Ceci, 2002; Carpenter, 2012). You can transfer learning across subjects (math skills used in science problems), across physical contexts (learned in school, used on the job), across social contexts (learned alone, used with your family or team), across time periods (learned in college, used months or years later), across functions (learned for academics, used for hobbies and recreation), and across modalities (learned from watching the Home and Garden cable channel, used to create a reading corner in your classroom). Using an analogy to make a connection between a familiar topic and a way to solve a new type of problem is another kind of transfer (Jacobson et al., 2020; Sidney & Thompson, 2019). So transfer can refer to many different examples of applying knowledge and skills beyond where, when, and how you learned them.

The Many Views of Transfer

Transfer has been a focus of research in educational psychology for over 100 years. After all, the productive use of knowledge, skills, and motivations across a lifetime is a fundamental goal of education (Goldstone & Day, 2012). Early work focused on specific transfer of skills and the general transfer of *mental discipline* gained from studying rigorous subjects such as Greek or mathematics. But in 1924, E. L. Thorndike demonstrated that no mental discipline benefit is derived from learning Greek. Learning Greek just helps you learn more Greek. So, thanks to Thorndike, you were not required to take Greek in high school. There is some recent evidence, however, that learning computer programming can

Table 9.5 Kinds of Transfer

	DIRECT APPLICATION	PREPARATION FOR FUTURE LEARNING
Definition	Automatic transfer of highly practiced skill	Conscious application of abstract knowledge to a new situation Productive use of cognitive tools and motivations
Key Conditions	Extensive practice Variety of settings and conditions Overlearning to automaticity	Mindful focus on abstracting a principle, main idea, or procedure that can be used in many situations Learning in powerful teaching–learning environments
Examples	Driving many different cars Using the subway or bus system in your community	Applying KWL or READS strategies Applying procedures from math in designing a page layout for the school newspaper

improve students' creative thinking, reasoning, and metacognitive skills in other areas. In the future, maybe more students will learn computer programming and benefit from transfer effects (Scherer et al., 2019).

Today, researchers distinguish between the automatic, direct use of skills such as reading or writing in everyday applications and the thoughtful transfer of knowledge and strategies to arrive at creative solutions to problems (Bereiter, 1995; Bransford & Schwartz, 1999). Automatic transfer probably benefits from practice in different situations, but thoughtful transfer requires more than practice. Michelene Chi and Kurt VanLehn (2012) describe thoughtful transfer as involving two processes—*initial learning* and *reusing or applying* what was learned. For thoughtful transfer to succeed, students must first actually learn the underlying principle or concept, not just the surface procedure or algorithm. So essential to thoughtful transfer in the initial learning stage is *mindful abstraction*, which is the deliberate identification of a principle, main idea, strategy, or procedure that is not tied to one specific problem or situation but could apply to many. Such an abstraction becomes part of your metacognitive knowledge, available to guide future learning and problem solving. Table 9.5 summarizes the types of transfer.

Teaching for Positive Transfer

Here is a great perspective on transfer from David Perkins and Gavriel Salomon (2012):

> Schools are supposed to be stopovers in life, not ends in themselves. The information, skills, and understandings they offer are knowledge-to-go, not just to use on site. To be sure, often Monday's topics most conspicuously serve the Tuesday problem set, the Friday quiz, or the exam at the end of the year. However, in principle those topics are an investment toward thriving in family, civic, cultural, and professional lives. (p. 248)

Years of research and experience show that students will not always take advantage of *knowledge-to-go*. They may (seem to) learn new concepts, problem-solving procedures, and learning strategies Monday, but they may not use them for the year-end exam or even Friday unless prompted or guided. For example, studies of real-world mathematics show that people do not always apply math procedures learned in school to solve practical problems in their homes or at grocery stores (Lave, 1988; Lave & Wenger, 1991). This happens because learning is *situated*—tied to specific situations. Because knowledge is learned as a tool to solve particular problems, we may not realize that the knowledge is relevant when we

encounter a problem that seems different, at least on the surface—remember my students' complaints about studying boat problems and being tested on airplane problems (Driscoll, 2005; Singley & Anderson, 1989). How can you make sure your students will use what they learn, even when situations change?

WHAT IS WORTH LEARNING? First, you must answer the question "What is worth learning?" The learning of basic skills such as reading, writing, computing, cooperating, and speaking will definitely transfer to other situations because these skills are necessary for later work both in and out of school—writing job applications, reading novels, paying bills, working on a team, and locating and evaluating health care services, among other tasks. All later learning depends on positive transfer of these basic skills to new situations.

Teachers must also be aware of what the future is likely to hold for their students, both as a group and as individuals. What will society require of them as adults? As a child growing up in Texas in the 1950s and 1960s, I studied nothing about or with computers, even though my father was a computer systems analyst, yet now I spend hours at my Mac each day. My mom encouraged me to take advanced math and physics instead of typing in high school. Those were great classes, but I struggle with typing every day at my computer—who knew? Undoubtedly, changes as extreme and unpredictable as these await the students you will teach. For this reason, the general transfer of principles, attitudes, learning strategies, self-motivation, time management skills, and problem solving will be just as important for your students as the specific transfer of basic skills.

Overlearning
Practicing a skill past the point of mastery.

LESSONS FOR TEACHERS: SUPPORTING TRANSFER. For basic skills, greater transfer can also be ensured by **overlearning**, practicing a skill past the point of mastery. Many of the basic facts students learn in elementary school, such as the multiplication tables, are traditionally overlearned. Overlearning helps students develop automated basic skills, as we saw in Cluster 8.

For higher-level transfer, students must first learn and understand. Students will be more likely to transfer knowledge to new situations if they have been actively involved in the learning process. Strategies include asking students to explain to themselves or each other the worked examples provided by the teacher or identify for each step in a problem solution the underlying principle at work. Students also can learn a new concept and then explain it to peers, discuss it in small groups, or make videos to be used in peer learning (Chi & VanLehn, 2012; Hoogerheide et al., 2014; Pai et al., 2015). Students should be encouraged to form abstractions that they will apply later so they know transfer is an important goal. Also, teachers can give students warm-up activities that practice prior knowledge relevant to new learning. For example, students can practice division with whole numbers using physical objects before the teacher starts to explain and demonstrate division with fractions. This provides an implicit analogy to transfer prior knowledge to learning the new material (Sidney & Thompson, 2019). Finally, one of the most powerful strategies for supporting transfer is retrieval practice through frequent testing and applying knowledge (Carpenter, 2012).

Positive transfer is encouraged when skills are practiced under authentic conditions, similar to those that will exist when the skills are needed later. Students can learn to write by corresponding with email pen pals in other countries. They can learn historical research methods by studying their own family history. Some of these applications should involve complex, ill-defined, unstructured problems because many of the problems to be faced in later life, both in school and out, will not come to students complete with instruction manuals.

One last kind of transfer is especially important for students—the transfer of the *learning strategies* we encountered earlier. Learning strategies are meant to be applied across a wide range of situations.

STAGES OF TRANSFER FOR STRATEGIES. Too often, students learn strategies but never apply them beyond the lessons or assignments where they first studied the strategies (Schunk, 2020). Gary Phye described three stages in developing strategic transfer. In the *acquisition phase*, students should not only receive instruction about a strategy and how to use it but also rehearse the strategy and practice being aware of when and how they are using it.

In the *retention phase*, more practice with feedback helps students hone their strategy use. In the *transfer phase*, students should be given new problems that they can solve with the same strategy, even though the problems appear different on the surface. To enhance motivation, teachers should point out to students how using the strategy will help them solve many problems and accomplish different tasks. These steps help build both procedural and self-regulatory knowledge—*how* to use the strategy as well as *when* and *why* (Phye, 1992, 2001).

Some students will master productive learning and study strategies on their own, but all students can benefit from direct teaching, modeling, and practice with feedback. This is one important way to prepare all of your students for the future. The *Guidelines: Family and Community Partnerships* give ideas for enlisting the support of families in encouraging transfer.

GUIDELINES

Family and Community Partnerships

Promoting Transfer

Keep families informed about their child's curriculum so they can support learning.

Examples

1. At the beginning of units or major projects, send a letter summarizing the key goals, a few of the major assignments, and some common problems students have in learning the material for that unit.
2. Ask parents for suggestions about how their child's interests could be connected to the curriculum topics.
3. Invite parents to school for an evening of "strategy learning." Have the students teach their family members one of the strategies they have learned in school.

Give families ideas for how they might encourage their children to practice, extend, or apply learning from school.

Examples

1. To extend writing, ask parents to encourage their children to write letters or emails to companies or civic organizations asking for information or free products. Provide a shell letter form for structure and ideas, and include addresses of companies that provide free samples or information.
2. Ask family members to include their children in some projects that require measurement, halving or doubling recipes, or estimating costs.
3. Suggest that students work with grandparents to do a family memory book. Combine historical research and writing.

Show connections between learning in school and life outside school.

Examples

1. Ask families to talk about and show how they use the skills their children are learning in their jobs, hobbies, or community involvement projects.
2. Ask family members to come to class to demonstrate how they use reading, writing, science, math, or other knowledge in their work.

Make families partners in practicing learning strategies.

Examples

1. Focus on one learning strategy at a time. Ask families to simply remind their children to use a particular strategy with homework that week.
2. Develop a lending library of books, website resources, and DVDs to teach families about learning strategies.
3. Give parents a copy of the *Guidelines: Becoming an Expert Student* on page 400, rewritten for your grade level.

Bringing It All Together: Teaching for Complex Learning and Robust Knowledge

We began this cluster by talking about complex cognitive skills and higher-order learning. Then we went on to explore metacognition and learning strategies, problem solving and expertise, critical thinking and argumentation, and transfer of learning to new situations. Even though research in educational psychology has examined these topics for years, lately, some researchers have focused specifically on complex learning and teaching for robust knowledge—the kind that experts have (Richey & Nokes-Malach, 2015). In many ways this current focus brings together much of what we have learned in this cluster.

What Is Robust Knowledge?

The study of expertise points to three important characteristics of robust knowledge—it is deep, connected, and coherent. *Deep knowledge* is knowledge about underlying principles that allows experts to recognize the same principle-based features in seemingly different problems. For example, having robust knowledge in math enables students to see immediately that river current problems and airplane wind problems can be solved with the same underlying principles. *Connected knowledge* means many separate bits of information are linked—problem-solving steps are linked automatically within a problem, abstract principles are linked to specific features of a problem, concepts are linked to appropriate procedures, and principles are connected across different disciplines and domains. *Coherent knowledge* is consistent and has no contradictions. Experts are much better than novices at detecting inconsistencies in knowledge (Richey & Nokes-Malach, 2015). As teachers, we want all our students to develop robust knowledge.

Teaching for Robust Knowledge

What are some instructional strategies that help students move from novice to expert skill—that help them develop robust knowledge that is deep, connected, and coherent? In the next cluster we explore several teaching approaches such as inquiry and problem-based learning that target the construction of robust knowledge. Here, let's review five strategies that can be incorporated into most teaching approaches: practice, worked examples, analogies, integrating multiple texts, and self-explanation.

PRACTICE. You have read about practice in several clusters of this book. Overlearning, or practicing even after you can do a skill or procedure, makes performance smooth, fast, and automatic—with little drain at all on working memory. Retrieval practice or testing is better than restudying for remembering information. Practice can be very effective in developing procedural knowledge of how to do things, but it is not that beneficial by itself in helping students learn to do analogous things—solve new problems; form abstract concepts and deep, principle-based understandings; or connect knowledge across situations. In fact, if your students are very practiced at one procedure in math or art or writing, they may try to apply it even when that procedure or skill is inappropriate, so developing robust knowledge takes more than practice. To develop expertise, you need deliberate practice, that is, establish clear criteria for excellence, identify discrepancies between current performance and criteria, practice improving, fail, and try again until you reach the goals.

WORKED EXAMPLES. Worked examples can support the development of robust knowledge by managing cognitive load so that students' working memory is not overwhelmed. This leaves enough working memory available to recognize and remember key features and deeper structures in the problem. Instead of trying to solve a problem by trial and error, students see the pathway and target their cognitive resources on learning. But worked examples and practice share some of the same obstacles to developing robust knowledge. Students

can get better at doing the kind of problem in the examples, but not at doing different kinds of problems. One solution is to *interleave* (interweave or alternate) worked examples with practice problems and with other worked examples that have steps left out. This makes students think more deeply about what they are doing and why. But the best use of worked examples requires students to explain to themselves why each step in the example is necessary.

ANALOGIES. To use analogies, students map the similarities or shared features between two examples, cases, problems, time periods, works of art, and so on. Using analogies can support transfer as students apply what they know to recognize similar processes at work in seemingly different situations. The students are also building robust conceptual knowledge by linking key features in the problems to underlying principles. One problem, however, is that novices may identify analogies based on superficial similarities that have nothing to do with deep structure or underlying principles—for example, "both paintings are blue" instead of "both paintings are examples of cubism." The careful selection of cases or problems plus some teacher guidance are important here.

INTEGRATING MULTIPLE TEXTS. We saw earlier that using multiple sources to study history led to better understanding (Nokes et al., 2007). Sarit Barzilai and her colleagues (2018) go even further to claim that "the ability to meaningfully and critically integrate multiple texts is vital for twenty-first-century literacy" (p. 973). We are bombarded with information from multiple sources every day, and the list goes way beyond books and television to speeches, videos and photographs, charts, social media, talk radio, the Internet—on and on. Without the ability to critically integrate information, students fall back on their own biases or are swayed by the most appealing or dramatic presentation. How do students learn to build robust and reliable knowledge from multiple sources that may present conflicting, complementary, or overlapping information? In a review of 21 studies of students from fifth grade through college, researchers found that text integration can be taught. In the studies, lessons about integrating texts occurred in different subjects, depending on grade level: language arts for younger students, history for secondary students, and science and social sciences for college students. The teachers in the studies used a variety of effective approaches including explicitly teaching students how to integrate information, modeling integration processes, collaborative student discussions based on multiple texts, using graphic organizers (tables, graphs, flow charts, timelines, maps), and having students practice individually. As students practice, teachers can provide reminders to integrate information. It helps to read and also write—that is, to put your integrated understanding into words. Finally, teachers need to spend some time explaining the value of being able to integrate information from multiple texts. Teach why, when, and how. Then model, provide practice with feedback, and try again—the usual suspects.

SELF-EXPLANATIONS. To build robust knowledge, the big winner is self-explanation. Explaining each step in a worked example, drawing a model, explaining to a peer (especially creating a drawing and explaining it to someone), providing evidence, telling why, justifying an answer—these self-explanations are better than detailed explanations by the teacher in building robust knowledge. You will learn in the next cluster that students who explain in a cooperative learning group learn more than students who receive explanations. Self-explanation encourages connections (why, what else, how, when…?) and coherence (does that make sense? Are there any contradictions in the explanation?).

Module 30 Summary

Critical Thinking and Argumentation (pp. 403–408)

What is critical thinking? Critical thinking skills include defining and clarifying the problem, making judgments about the consistency and adequacy of the information related to the problem, and drawing conclusions. No matter what approach you use to develop critical thinking, it is important to follow up activities with additional practice. One lesson is not enough—overlearning will help students use critical thinking in their own lives. Today, critical thinking

about online sources has become truly critical. Direct teaching, teacher modeling and think-alouds, and student discussions of conflicting information based on Who? (author and credentials), Why? (motivation and purpose), and Where? (published by trustworthy source) can support student critical analysis of online sources.

What is argumentation? There are two styles of argumentation—*disputative* and *deliberative*. The heart of *disputative argumentation* is supporting your position with evidence and understanding and then refuting your opponent's claims and evidence. It is a competitive process where the goal is to convince an opponent to switch sides. The basic question is *who* is right. With *deliberative argumentation*, the goal is to collaborate in comparing, contrasting, and evaluating alternatives, then arrive at a constructive conclusion. The basic question is *which idea* is right. Argumentation skills are not natural. They take both time and instruction to learn. It is especially difficult for children and adolescents to pay attention to, understand, and refute an opponent's position with evidence (disputative argumentation). Deliberative argumentation also requires learning and practice.

Teaching for Transfer (pp. 408–411)

What is transfer? Transfer occurs when a rule, fact, or skill learned in one situation is applied in another situation; for example, applying rules of punctuation to write a job application letter. Transfer also involves applying to new problems the principles learned in other, often dissimilar situations.

What are some dimensions of transfer? Information can be transferred across a variety of contexts. Some examples include transfer from one subject to another, one physical location to another, or one function to another. These types of transfer make it possible to use skills developed in one area for many other tasks.

Distinguish between automatic and thoughtful transfer. Spontaneous application of well-learned knowledge and skills is automatic transfer. Thoughtful transfer involves *initial learning* and *reusing or applying* what was learned. Essential in the *initial learning* stage is mindful abstraction, which is the deliberate identification of a principle, main idea, strategy, or procedure that is not tied to one specific problem or situation but could apply to many. Learning environments should support active constructive learning, self-regulation, collaboration, and awareness of cognitive tools and motivational processes. In addition, students should deal with problems that have meaning in their lives. Teachers can help students transfer learning strategies by teaching strategies directly, providing practice with feedback, and then expanding the application of the strategies to new and unfamiliar situations.

Bringing It All Together: Teaching for Complex Learning and Robust Knowledge (pp. 412–413)

How do you recognize robust knowledge? In terms of perceiving and representing the problem, novices focus on surface features, whereas experts focus on the structure and larger concepts underlying the problem. Experts can recall from their long-term memory many important details about the problem domain, but novices rely mostly on what they can hold in their working memory, and they often get overwhelmed. In actually solving the problem, novices have to rely on general problem-solving strategies that take a long time, are filled with errors, and often fail. Experts, on the other hand, quickly and accurately apply the appropriate domain-specific strategy for that particular problem type. Finally, because novices' knowledge is based on surface details of problems, they have no principles or conceptual knowledge to transfer to new situations, whereas the flexible, deep, connected, coherent knowledge of experts gives them abundant useful knowledge to transfer to new situations and problems.

How can teaching develop robust knowledge? Five strategies that we have covered in this cluster can be incorporated into most teaching approaches: practice, worked examples, analogies, integrating multiple texts, and self-explanation. Each of these five strategies can be useful, but the big winner is self-explanation. Explaining each step in a worked example, drawing a model, explaining to a peer, providing evidence, telling why, justifying an answer—these self-explanations are better than detailed explanations by the teacher in building robust knowledge.

Cluster 9 Review

Key Terms

Algorithm
Analogical thinking
Argumentation
Availability heuristic
Belief perseverance
CAPS
Cmaps
Concept map
Confirmation bias
Critical thinking
Deliberate practice
Embodied cognition
Executive control processes
Functional fixedness
Heuristic
KWL
Learning strategies
Means-ends analysis
Metacognition
Overlearning
PARS
Problem
Problem solving
Production deficiency
Representativeness heuristic
Response set
Retrieval practice/testing effect
Schema-driven problem solving
Transfer
Verbalization
Working-backward strategy

Connect and Extend to Licensure

Multiple-Choice Questions

1. What higher-order knowledge can make the difference between how well and quickly students learn material?

A. Declarative

B. Rote

C. Metacognition

D. Procedural

2. Knowing the importance of metacognition, Joanna Pappas decided she would try to focus her young students' attention on their own thinking skills. Joanna knew by having her students "think" about their thinking they would eventually increase their metacognitive skills. Which one of the following strategies should Joanna employ?

A. Insight

B. A KWL chart

C. An algorithm

D. Overlearning

3. Teachers often neglect to teach their students about when, where, and why they should use various strategies. A strategy is more apt to be retained and appropriately used when educators directly teach which type of knowledge?

A. Declarative

B. Procedural

C. Self-regulatory

D. Rote

4. Fourth-graders Richard and Bruce sat on the stoop outside of the school. They had missed their bus and now had to make the decision whether to walk taking a shortcut or just wait until their mothers noticed they had not arrived home.

"I think we should start walking on the path, and maybe we will get there before they notice we missed the bus."

"I think we should wait. If we walk on the path and our mothers come to get us, they won't see us, and they'll worry. Missing the bus is bad enough. If my mom can't find me, she'll be really mad!" In what type of problem solving are the two boys engaged?

A. Heuristic

B. Schema-driven

C. Algorithm

Constructed-Response Questions

Case

Karen Slagle walked away from her friends on the playground. She had just had an argument over who would win the spot as class president. "I know my brother will win. He has more friends and that equals more votes."

"Karen, you can't be serious. What about the issues such as school policies and procedures?"

"Those issues don't matter. Regina Hoyt won because she was popular last year. The only real issue is popularity."

"What about the year before last when the captain of the football team lost because his campaign didn't deal with anything but sports issues?"

"That was a fluke. Look at our freshman year. That popular basketball player won."

5. How is Karen Slagle's argument an example of confirmation bias?

6. In the current argument, Karen Slagle is not practicing critical thinking. What types of strategies do critical thinkers employ?

What Would They Do?

Teachers' Casebook: Uncritical Thinking

At the beginning of this cluster, we asked you to think critically about how to help students learn to evaluate the information they find on the Internet. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Robert John Hovel Jr. • 11th- and 12th-Grade AP Psychology Teacher

Lyman High School, Longwood, FL

Knowing where your information is coming from is critical not only so the correct information is being utilized, but also so your own work is credible as well. For these students, all they have known is the Internet. Tracing information they are finding on the Internet back to where it actually came from is not only a great learning experience, it is also a very good life lesson to implement in class. My grandma always taught me to "consider the source" of where all my information, meaning rumors or otherwise, was coming from. This lesson can be brought back to considering where the information is found and considering if the "source" they are using is actually credible. Then, having them examine the credibility of the source, they can determine if it is a good source to use or not with your guidance. Furthermore, this can be brought to life in a larger, more realistic context with students in helping them learn about if information they hear is coming from a "credible source." They can be taught to not listen to rumors and false information about people, whatever the age of the student, and hopefully glean a more authentic self from the learning process.

Vickie Moriarity • 7th-Grade English/Language Arts Teacher

Bath County Middle School, Owingsville, KY

Writing research papers and arguments requires strong reading comprehension skills. Just because students can read fluently does not mean they understand what they are reading. To help students overcome this deficit, I teach them a strategy called **Read, Cover-Up, Paraphrase**. Students read a single sentence of text, cover it up, and paraphrase it in simpler language that a fifth grader might understand. It is astounding how many students struggle to do this. It may take between 3–12 times before many students can analyze a sentence; we often break longer sentences into chunks and then put them back together. After reading a paragraph this way, I have students write one sentence gists that answer the questions "who, what, where, when, why, and how."

I also emphasize the importance of knowing any biases of website creators. I teach students that .edu, .gov, and .org sites tend to be more trustworthy and teach them to question everything they read online. I show students the "Save the Pacific Northwest Tree Octopus site" out of the blue to show how real "fake" information can look in today's world. I share Snopes .com with students to verify information.

Finally, I constantly ask the questions "why" and "how" in my room to assess critical thinking. I ask for proof when opinions are offered, and I require students to tell me how the evidence they choose supports their opinions. These questions require [the] students to think critically, an incredibly challenging skill. I compare it to how sports announcers use commentary to share their thoughts about the facts. I created a video for this skill—You can access it on YouTube, by searching for "Vickie Moriarity What Does a Good Explanation Look Like?"

Paul Dragin • 9th–12th-Grade ESL Teacher

Columbus East High School, Columbus, OH

This common problem does not have an easy fix. For example, years ago, one of my students completed a research paper about 9/11, and the paper was filled with conspiracy theories that the student reported as fact. This dramatic example of undocumented, unsubstantiated research opened my eyes to the need to teach research methods far more explicitly to my students. Here is my general strategy to help ensure more quality research: After allowing the students to explore using Google and other common search engines to get some familiarity with their topic, I direct them to a reference database such as EBSCOhost or ProQuest, which, in our city, can be accessed with a library card via the public library website. Limiting the databases they can use reduces the likelihood that inaccurate and highly biased information makes its way into their reports. Demonstrating to them the difference between research-based, scholarly information and general information can go a long way in producing a product that demonstrates actual research.

Sara Vincent • High School Special Education Teacher

Langley High School, McLean, VA

The Internet is a useful tool for students, but it is filled with a plethora of bad information. Luckily, the teacher in the described scenario can fix the problem before the students' submission of their final drafts. As an English teacher, I often encounter this problem but find that the majority of the students will comply if I set strict citation guidelines. After returning the first drafts to the students, I devote the next lesson to using credible sources rather than using less-reliable sources. I show examples of absurd claims from Internet websites. I also show the students how to find appropriate information. The students then exchange papers and complete a peer-editing lesson. In this lesson, students critique areas of their peers' drafts in which the sources were weak or nonexistent. To create strict citation guidelines, I tell my students that they are not allowed to use any website that ends in ".com." Instead, they only are allowed to use websites that end in ".edu" or ".gov," or they can use online databases such as JSTOR. Choosing to use an inappropriate site results in automatic failure on the assignment. If teachers use these strict guidelines, their students are highly likely to choose credible websites.

Paula Colemere • High School Special Education English and History Teacher
McClintock High School, Tempe, AZ

I usually teach my research unit after we have done persuasive reading and writing. Because I teach students how to evaluate information for bias during the persuasive unit, I know they have some prior knowledge before we tackle research. I show examples from scholarly journals, books, and general websites like Wikipedia. Then, as we discuss, I think aloud to model for students why I would or would not use a source. I typically do not allow my students to use any web sources and keep them to the sites that are preapproved in our library's database. If I were to allow a web-based source, it would be limited to one. It is extremely helpful to students if you can show them sample research papers that are excellent, satisfactory, and poor. This way, they have an idea of what the finished product should look like. Another strategy would be to read a passage as a class and critically evaluate it together. Thinking critically is a skill that needs to be modeled and taught to kids. It is a mistake to assume they know how to do this on their own.

Jessica N. Mahtaban • 8th-Grade Math Teacher
Woodrow Wilson Middle School, Clifton, NJ

The best way to show students how to evaluate information from websites is by modeling. I have a PowerPoint presentation that explains to students how to evaluate the authenticity of what they are reading on the Internet. Once the students become familiar with all the key points of how to evaluate websites, then I can show various websites on the Smart board, and as a class we can discuss and review the validity of the site.

We need to teach students how to articulate their thoughts by expanding on their ideas. Teachers can add, "Why or why not?" or "explain" to the end of questions. If students are exposed to higher-level thinking questions and learn how to ask and answer these questions, then they can think more critically about school subjects.

Jennifer Pincoski • K–12 Learning Resource Teacher
Lee County School District, Fort Myers, FL

Understanding that the Internet plays such a significant role in students' lives and that it does provide reliable information, the class needs to be taught how to appropriately use the web for research. This involves teaching strategies on how to identify credible information, and providing ample opportunities for practice.

To understand that not all information on the Internet is accurate, students need to see real examples—examples that are relevant to them. This could be as simple as exposing them to several different sites that post conflicting information about the same topic and then asking them to define how they would decide which information to believe.

Once students recognize that they need to exercise discretion when retrieving information from the Internet, they can be taught HOW to do so. The teacher can provide a list of guiding questions that will help students critically evaluate their sources. The ultimate goal is for students to use the guiding questions independently and apply them across settings; however, in the beginning, students will require a much higher level of support. An "I do, we do, you do" approach is probably the best way to assist students in the development and practice of these skills.

Lauren Rollins • 4th-Grade Teacher
Boulevard Elementary School, Shaker Heights, OH

The Internet is a fantastic resource when it is used properly. Unfortunately, because anyone can post information on the Internet, it is not always reliable or factual. With respect to evaluating information found on the Internet, I encourage my students to visit multiple sites with multiple viewpoints so they can weigh the relative merits of each. In this way, they practice their critical thinking skills. Using examples of "factual" information found on websites that contradict clearly accepted facts will teach the students that they must evaluate information in the context of what they know to be true. This will help them to understand that multiple sources, not just the Internet, should be used. In addition, I devote some time to teaching my students how to properly cite sources from the Internet and other sources. This is an important skill and also a necessary one so that they will not be suspected of plagiarism.

Linda Sparks • 1st-Grade Teacher
John F. Kennedy School, Billerica, MA

Whenever I assign a new research project, I begin with a specific list of resource instructions. For example, I might state that I want two books, two magazine articles, and three websites. After the topic is picked, I have the students pull together their resources and come to me so that I can check them to make sure each student is headed in the right direction. It also gives me a better understanding of what they are researching and I can find out if they have any misconceptions about the project. I find I get better results this way, because the students know I am aware of what they are researching and have their lists of resources. (Even if they don't use all their sources, I want them to see what is available for them.) I also am more prepared to teach specific writing skills. The first skill I teach before I assign a project as they practice reading articles is how to take that information and transfer it into their own words. Limiting the number of quotes is a way to encourage higher-level thinking processes. Many times, when given the chance, students are more creative than the writers of the articles they read.

Barbara Presley • High School Transition/Work Study Coordinator
BESTT Program (Baldwinsville Exceptional Student Training and Transition Program), C. W. Baker High School, Baldwinsville, NY

To me, discussion is key: whole-group discussion, small-group discussion, and one-to-one discussion, all the time being prepared to defend or criticize (with legitimate corroboration) topics raised. Students learn well from their mistakes as long as the correction is respectful and meaningful to them personally. They can't learn to think critically until someone questions their premises and they have to defend their position—as long as the discussions are conducted without malice. They are gaining experience in critical thinking through the process of criticism, both given and received.

Cluster 10

Constructivism and Interactive Learning



Ester Y., Age 9, Virginia, USA ICAF.org

Teachers' Casebook:

Necessity Is the Mother of Inventive Teaching

What Would You Do?

Your school went through the stay-at-home period during the COVID-19 outbreak that required remote instruction off and on. Even when the schools reopened, a good number of parents were reluctant to send their children back due to health concerns. You had to plan remote instruction for these students while also continuing in-person teaching for the rest of the class. For a while, it was difficult to create opportunities for collaborative learning. Even with all the challenges, you discovered several new teaching and management approaches, taking advantage of the online format and resources. That difficult time opened up new possibilities for teaching and learning.

Critical Thinking

- What are the critical features of effective technology-enhanced instruction?
- As you plan for similar possibilities in the future, what online or hybrid strategies, resources, assignments, or assessments would you incorporate into your curriculum for the year?

- How would you get your students to be both independent and engaged when they were learning remotely?
- How would you help your students collaborate with each other in a meaningful way, even when they are far apart?

Overview and Objectives

For the past three clusters, we have analyzed different aspects of learning. We have considered behavioral, information processing, and cognitive science explanations of what and how people learn. We have examined complex cognitive processes such as metacognitive skills and problem solving. These explanations of learning focus on individuals and what is happening in their "head." In this cluster, we expand our investigation of learning to focus on how the social context of learning is involved in the way learners construct meaning. Constructivism is a broad perspective that calls attention to two critical aspects of learning: social and cultural factors. Sociocultural constructivist theories have roots in cognitive perspectives but have moved well beyond these early explanations. We will explore a number of teaching strategies and approaches that are consistent with sociocultural constructivist perspectives—teacher facilitation, inquiry, problem-based learning, cooperative learning, and cognitive apprenticeships. We will also focus on the ways that digital technologies enable interactive learning to take place in online spaces and through blended learning approaches like the flipped classroom.

By the time you have completed this cluster, you should be able to:

10.1 Explain different perspectives on constructivism as a theory of learning and teaching.

10.2 Identify the common elements in most contemporary constructivist theories.

10.3 Apply constructivist principles to classroom practice including using inquiry, problem-based learning, and cognitive apprenticeships.

10.4 Appropriately incorporate collaboration and cooperative learning in your classes.

10.5 Describe positive and negative influences of technology-mediated instruction on how children and adolescents develop and learn.

OUTLINE

Teachers' Casebook—Necessity Is the Mother of Inventive Teaching: What Would You Do?
Overview and Objectives

MODULE 31: Constructivism and Teaching
Cognitive and Social Constructivism
Constructivist Views of Learning
How Is Knowledge Constructed?

Knowledge: Situated or General?
Common Elements of Learner-Centered Teaching

Designing Constructivist Learning Environments
Facilitating Deep Learning in a Constructivist Classroom
Inquiry-Based Learning
Cognitive Apprenticeships

MODULE 32: Collaboration and Cooperation in Teaching and Learning
Collaboration and Cooperation
Learning in Groups
Learning Through Cooperation
Designing Cooperative Learning Tasks
Setting Up Cooperative Groups
Examples of Cooperative Learning Techniques
Reaching Every Student: Using Cooperative Learning Wisely

MODULE 33: Technology in Teaching and Learning
Designing Interactive Digital Learning Environments
Technology and Learning
Technology-Rich Environments
Computational Thinking and Coding
Media Use, Digital Citizenship, and Media Literacy
Blending and Flipping: Technology-Powered Pedagogy
Dilemmas of Constructivist Practice

Cluster 10 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Necessity Is the Mother of Inventive Teaching: What Would They Do?

MODULE 31 Constructivism and Teaching

Learning Objective 10.1 Explain different perspectives on constructivism as a theory of learning and teaching.

Learning Objective 10.2 Identify the common elements in most contemporary constructivist theories.

Learning Objective 10.3 Apply constructivist principles to classroom practice including using inquiry, problem-based learning, and cognitive apprenticeships.

Cognitive and Social Constructivism

Consider this situation:

> A young child who has never been to the hospital is in her bed in the pediatric wing. The nurse at the station down the hall calls over the intercom above the bed, "Hi, Naomi, how are you doing? Do you need anything?" The girl looks puzzled and does not answer. The nurse repeats the question with the same result. Finally, the nurse says emphatically, "Naomi, are you there? Say something!" The little girl responds tentatively, "Hello, wall—I'm here."

Naomi encountered a new situation—a talking wall. The wall is persistent. It sounds like a grown-up wall. She shouldn't talk to strangers, but she is not sure about walls. She uses what she knows and what the situation provides to construct meaning and to act.

Here is another example of constructing meaning. This time, Maria and her 9-year-old son, Isaac, co-construct understandings as they buy groceries:

> *Isaac:* (running to get a shopping cart) Do we need the big one?

Maria: We might—better too big than not big enough. Here is our list—where do we go first?
Isaac: We need ice cream for the party! (Isaac heads toward frozen foods.)
Maria: Whoa! What happened to the ice cream carton you left out on the kitchen counter?
Isaac: It melted and it wasn't out that long. I promise!
Maria: Right and we may be in this store a while, so let's start with things that won't melt while we are shopping—I usually buy produce first.
Isaac: What's "produce"?
Maria: Things that grow—fruits and vegetables "produced" by farmers.
Isaac: Ok, the list says cucumbers. Here they are. Wait, there are two kinds. Which do you want? The little ones say "local." What's local?
Maria: Local means from around here—close to us, close to our "location."
Isaac: Is local better?
Maria: Maybe. I like to support our local farmers. Where are the small cucumbers from—look at the tiny print on the label.
Isaac: Virginia—is that close to us?
Maria: Not really—it is about a 6-hour drive from here. . . .

Look at the knowledge being co-constructed about planning ahead, vocabulary, problem solving, and even geography. Constructivist perspectives of learning focus on how people make meaning, both on their own like Naomi and in interactions with others like Isaac.

Constructivist Views of Learning

Constructivism/ Constructivist approach
View that emphasizes the active role of the learner in building understanding and making sense of information.

Constructivism is a broad and much-debated term. Actually, constructivism is more a *philosophy* about knowledge than a scientific theory of learning. Various constructivist perspectives are grounded in the research of Piaget, Vygotsky, the Gestalt psychologists, and the work of Bartlett, Bruner, and Rogoff. The philosophy of John Dewey and Jean Lave's work in anthropology also are intellectual roots of constructivism. But even though many psychologists and educators use the term *constructivism*, they often mean very different things (J. Martin, 2006; McCaslin & Hickey, 2001; Phillips, 1997). Although there is no single constructivist theory, most constructivist perspectives do agree on two central ideas:

Central Idea 1: Learners are active in constructing their own understanding—they create knowledge by going beyond the information they are given (Chi & Wylie, 2014).

Central Idea 2: Social interactions are important in this knowledge construction process (Bruning et al., 2011; Schunk, 2020).

One way to organize constructivist views is to describe two forms of constructivism that match these central ideas: cognitive and social construction (Palincsar, 1998; Phillips, 1997). *Cognitive constructivists* focus on how individuals use information, resources, and even help from others to build understanding—see Central Idea 1. In contrast, *social constructivists* view the social environment as critical to learning and development; we learn by participating with others in activities that are meaningful in the culture—see Central Idea 2 (Dohn, 2016; Windschitl, 2002). Let's look a bit closer.

COGNITIVE CONSTRUCTIVISM. Many psychological theories include some kind of constructivism because these theories embrace the idea that individuals construct their own cognitive structures as they make sense of their experiences (Palincsar, 1998). Because these theories emphasize the development of personal knowledge, beliefs, self-concept, or identity, they sometimes refer to learners as *individual constructivists* or *psychological constructivists*; they all focus on the inner psychological life of people. When Naomi talked to the wall in the previous section, she was making meaning using her own individual knowledge and beliefs about how to respond when someone (or something) talks to you (Piaget, 1971; Windschitl, 2002). When children observe that most plants need soil to grow and then conclude that plants "eat dirt," they are using what they know about how eating supports life to make sense of plant growth (Linn & Eylon, 2006).

Using these standards, the most recent *information processing* theories are constructivist in nature because they are concerned with how individuals construct internal representations (propositions, images, concepts, schemas) that can be remembered and retrieved (Mayer, 2012; Schunk, 2020). Some psychologists, however, believe that information processing is "trivial" or "weak" constructivism because the individual's only constructive contribution is to build accurate internal representations of the outside world, not to construct a unique and individual understanding (Derry, 1992; Garrison, 1995; Marshall, 1996; Windschitl, 2002).

In contrast, Piaget's psychological (cognitive) constructivist perspective is less concerned with "correct" representations and more interested in meaning as constructed by the individual. Piaget's special focus was on logic and the construction of universal knowledge such as *conservation* or *reversibility*—concepts you learned about in Cluster 3 (Miller, 2016). Such knowledge comes from reflecting on and coordinating our own cognitions or thoughts, not from copying external reality. Piaget saw the social environment as an important factor in development, but he did not believe that social interaction was the main mechanism for changing thinking.

Radical constructivism
Knowledge is assumed to be the individual's construction; it cannot be judged right or wrong.

At the extreme end of individual constructivism is the notion of **radical constructivism**. This perspective holds that each of us constructs meaning (knowledge) from our own experiences as we try to explain to ourselves what we perceive, but we have no way of understanding or "knowing" that the knowledge constructed by others or ourselves is "correct." Learning for radical constructivists consists of replacing one construction with another that better explains the person's current perceptions of reality (Hennessey et al., 2012). A difficulty with this position is that, when pushed to the extreme of relativism, all knowledge and all beliefs are equal because they are all valid individual perceptions.

There are problems with this thinking for educators. First, teachers have a professional responsibility to emphasize some values, such as honesty or justice, over others, such as deception and bigotry. All perceptions and beliefs are not equal. Second, in many fields, there are "right" answers that have been reached by scientific consensus; students will have trouble learning if they hold on to personal misconceptions and naïve constructions (Moshman, 2021). As teachers, we ask students to work hard to learn. If learning cannot advance understanding because all understandings are equally good, then, as David Moshman (1997) noted, "We might just as well let students continue to believe whatever they believe" (p. 230). Also, it appears that some knowledge, such as counting and one-to-one correspondence (i.e., the idea that numbers correspond to specific quantities), is not constructed but innate. Knowing one-to-one correspondence is part of being human (Geary, 1995; Schunk, 2020).

SOCIAL CONSTRUCTIVISM. We have seen that in cognitive constructivism, learning means individually possessing knowledge (Central Idea 1). But much learning takes place in social contexts. From the perspective of *social constructivism*, learning is a socially mediated process in which learners, who belong to social groups, construct knowledge through interaction (Central Idea 2; Dohn, 2016; Mason, 2007). Vygotsky emphasized the second idea, that social interaction, cultural tools, and activity shape individual development and learning, just as Isaac's interactions and activities in the grocery store with his mother shaped his learning about anticipating possible consequences (running out of space in the shopping cart and melted ice cream), the meaning of "produce" and "local," and geography—"where is Virginia?" (Martin, 2006). By participating in a broad range of activities with others, learners *appropriate* the outcomes produced by working together; these outcomes could include both new strategies and knowledge. **Appropriating** means being able to reason, act, and participate using cultural tools—for example, using conceptual tools such as "force" and "acceleration" to reason in physics (Mason, 2007).

Appropriating
Being able to internalize or take for yourself knowledge and skills developed in interaction with others or with cultural tools.

Because Vygotsky's theory relies heavily on social interactions and the cultural context to explain learning, most psychologists classify him as a social constructivist (Palincsar, 1998; Prawat, 1996). However, some theorists categorize him as a cognitive constructivist because he was primarily interested in development within the individual (Moshman, 1997; Phillips, 1997). In a sense, Vygotsky was both. One advantage of his theory of learning is that it gives

us a way to consider both the cognitive and the social: He bridges both camps. For example, Vygotsky's concept of the **zone of proximal development**—the area in which a child can solve a problem with the help (scaffolding) of an adult or more able peer—has been called a place where culture and cognition create each other (Cole, 1998). Culture creates cognition when the adult uses tools and practices from the culture (language, maps, technology, stories, or music) to steer the child toward goals the culture values (reading, writing, traditions, dance). Cognition creates culture as the adult, child, and members of the community together generate new practices and problem solutions to add to the cultural group's repertoire (Serpell, 1993). So people are both products and producers of their societies and cultures (Bandura, 2018). One way of integrating cognitive and social constructivism is to think of knowledge as both *individually constructed* and *socially mediated* (Windschitl, 2002).

Zone of proximal development
Developmental phase at which a child can master a task if given appropriate help and support from a more capable person.

How Is Knowledge Constructed?

These two different perspectives on constructivism raise some general questions, create some tensions, and suggest different answers. One question concerns *how* knowledge is constructed. Table 10.1 provides three explanations. Notice that the sources of knowledge (first column) differ because each approach is based on a different assumption about how individuals come to "know." By logical extension, therefore, the role of teachers and learners looks different for each approach.

Knowledge: Situated or General?

A second question that cuts across many constructivist perspectives is whether knowledge is internal, general, and transferable, or bound to the time and place in which it is constructed. Psychologists who emphasize the social construction of knowledge and situated learning affirm Vygotsky's notion that learning is inherently social and embedded in a particular cultural setting (Cobb & Bowers, 1999; Dohn, 2016; Schoor et al., 2015). What is true

Table 10.1 How Knowledge Is Constructed

KNOWLEDGE SOURCE	ASSUMPTIONS ABOUT KNOWLEDGE	IMPLICATIONS FOR TEACHING	EXAMPLE THEORIES
External	• Knowledge is acquired by constructing a representation of the outside world. • Knowledge is accurate to the extent that it reflects the "way things really are" in the outside world.	Direct teaching, feedback, and explanation affect learning.	Information processing
Internal	• Knowledge is constructed by transforming, organizing, and reorganizing previous knowledge. • Knowledge is not a mirror of the external world, even though experience influences thinking and thinking influences knowledge.	Exploration and discovery are more important than direct teaching. Teacher serves as guide.	Piaget's theory of cognitive constructivism
Both External and Internal	• Knowledge is constructed through social interactions and experience. • Knowledge reflects the outside world as filtered through and influenced by culture, language, beliefs, interactions with others.	Guided discovery, teaching, modeling, and opportunity for social interaction help the learner connect to prior knowledge, beliefs, and thinking, all of which affect learning.	Vygotsky's theory of social constructivism

Source: Bruning, Schraw, and Norby (2011); Moshman (1982); and Schunk (2020).

Community of practice
Social situation or context in which ideas are judged useful or true.

in one time and place—such as before the Middle Ages, when many accepted the "fact" that the earth was flat—becomes false in another time and place. Particular ideas may be useful within a specific **community of practice**, such as 15th-century navigation, but useless outside that community. What counts as new knowledge is determined in part by how well the new idea fits with current accepted practice. Over time, the current practice may be questioned and even overthrown, but until such major shifts occur, current practice will shape what is considered valuable and even what is considered knowledge.

Situated learning
The idea that skills and knowledge are tied to the situation in which they were learned and that they are difficult to apply in new settings.

Situated learning emphasizes that learning in the real world is not like studying in school. It is more like an apprenticeship where novices, with the support of community members who serve as expert guides and models, take on more and more responsibility until they can function independently. Proponents of this view believe situated learning explains learning in factories, around the dinner table, in high school halls, in street gangs, in the business office, in fan fiction communities, in artistic endeavors, on the playground, and so on (Ito et al., 2020).

Situated learning is often described as "enculturation," or forming an identity within a particular community by adopting its norms, behaviors, skills, beliefs, language, and attitudes. The community might be mathematicians or online gamers or writers or students in your eighth-grade class or soccer players—any group that has particular ways of thinking and acting. Knowledge is viewed not as individual cognitive structures but rather as a creation of the community over time. The practices of the community—the ways of interacting and getting things done as well as the identities and tools the community has created—constitute the knowledge of that community. Learning means becoming more able to participate in those practices, take on those identities, and use the tools (Dohn, 2016; Greeno et al., 1996; Mason, 2007).

At the most basic level, "situated learning emphasizes the idea that much of what is learned is specific to the situation in which it is learned" (Anderson et al., 1996, p. 5). Thus, some would argue, learning to do calculations in school may help students do more school calculations because the skills can be applied only in the context in which they were learned—namely, school (Lave, 1997; Lave & Wenger, 1991). But it also appears that knowledge and skills can be applied across contexts that were not part of the initial learning situation, as when you use your ability to read and calculate to do your income taxes, even though income tax forms were not part of your high school curriculum (Schunk, 2020).

Whether it takes place in school or in everyday contexts out of school does not necessarily make learning isolated or irrelevant (Bereiter, 1997). As you saw in Cluster 9, a major question in educational psychology—and education in general—concerns the transfer of knowledge from one situation to another. How can you encourage this transfer from one situation to another? Help is on the way in the next section.

Common Elements of Learner-Centered Teaching

Stop & Think What makes a lesson "student centered"? What experiences have you and your fellow students had where you were at the "center" of instruction? List the characteristics and features that put the student in the center of learning.

Connect and Extend to PRAXIS II®
Student-Centered Learning (II, A3)
Many of the major initiatives to reform content-area curricula (e.g., science, mathematics) emphasize student-centered/constructivist approaches to learning. Describe the major principles of these approaches, and explain how they differ from teacher-centered approaches.

We have looked at some areas of disagreement among the constructivist perspectives, but what about areas of agreement? All constructivist perspectives assume that knowing develops as learners, like Naomi and Isaac, try to make sense of their experiences. "Learners, therefore, are not empty vessels waiting to be filled, but rather active organisms seeking meaning" (Driscoll, 2005, p. 487). Humans construct mental models or schemas and continue to revise them to make better sense of their experiences. We are knowledge inventors, not copy machines or filing cabinets. Our constructions do not necessarily resemble external reality; rather, they are our unique interpretations, like Naomi's friendly, persistent wall. This doesn't mean that all constructions are equally useful or viable. Learners test their understandings against experience and the understandings of other people—they negotiate and co-construct meanings like Isaac did with his mother.

Constructivists share similar goals for learning. They emphasize knowledge *in use* rather than the *storing* of inert facts, concepts, and skills. Learning goals include developing abilities to find and solve ill-structured problems, critical thinking, inquiry, self-determination, and openness to multiple perspectives (Driscoll, 2005). Even though there is no single constructivist theory, many constructivist approaches recommend five conditions for learning:

1. Embed learning in complex, realistic, and relevant learning environments.
2. Provide for social negotiation and shared responsibility as a part of learning.
3. Support multiple perspectives, and use multiple representations of content.
4. Nurture self-awareness and an understanding that knowledge is constructed.
5. Encourage ownership in learning. (Driscoll, 2005; Marshall, 1992)

When these conditions for learning are met, learners are not recipients but co-creators of their learning—learners become the center rather than their teachers. Table 10.2 on the next page shows how student-centered learning approaches lead to deeper learning than do traditional, teacher-centered approaches (Sawyer, 2006). As you read more about the five common elements of constructivist teaching, think about whether these elements were present in your own classes when you were a student. Before we discuss constructivist teaching approaches consistent with this view, let's look more closely at these five conditions for learning.

COMPLEX LEARNING ENVIRONMENTS AND AUTHENTIC TASKS. Constructivists believe that students should not be given stripped-down, simplified problems and basic skills drills but instead should encounter **complex learning environments** that deal with "fuzzy," ill-structured problems. The world beyond school presents few simple problems or step-by-step directions, so schools should be sure that every student has experience solving complex problems. Complex problems are not just difficult ones; rather, they have many parts. They involve multiple, interacting elements and many possible solutions. There is no one right way to reach a conclusion, and each solution may bring a new set of problems.

Complex learning environments
Problems and learning situations that mimic the ill-structured nature of real life.

These complex problems should be embedded in authentic tasks and activities, the kinds of situations that students would face as they apply what they are learning in their everyday lives beyond school (Gutiérrez et al., 2017). Students may need support (*scaffolding*) as they work on these complex problems, with teachers helping them find resources, keeping track of their progress, breaking larger problems down into smaller ones, and so on. As they develop more expertise, learners can apply and modify their knowledge to fit different situations.

SOCIAL NEGOTIATION. Many constructivists share Vygotsky's belief that higher mental processes develop through **social negotiation** and interaction, so collaboration in learning is valued. A major goal of teaching is to develop students' *critical thinking* and *collaborative argumentation*—the abilities to establish and defend their own reasoned positions while respecting the positions of others and working together to negotiate or co-construct meaning. To accomplish this exchange, students must talk and listen to each other, weigh evidence for and against their position, and integrate information to support their argument. This process involves "learning to argue and arguing to learn" (Nussbaum, 2021, p. 10). Collaborative practices and productive dialogue can help students build shared meaning by finding common ground and exchanging interpretations (Howe et al., 2019).

Social negotiation
Aspect of learning process that relies on collaboration with others and respect for different perspectives.

MULTIPLE PERSPECTIVES AND REPRESENTATIONS OF CONTENT. When students encounter only one model, one analogy, one way of understanding complex content, they often oversimplify as they try to apply that one approach to every situation. I (Anita) saw this happen in my educational psychology class when six students were presenting an example of guided discovery learning. The students' presentation was a near copy of a guided discovery demonstration I had given earlier in the semester, but with some major misconceptions. My students knew only one way to represent discovery learning. Resources for the class should have provided **multiple representations of content** using different

Multiple representations of content
Considering problems using various analogies, examples, and metaphors.

Table 10.2 How Deep Learning Contrasts with Learning in Traditional Classrooms: Principles and Examples

LEARNING IN TRADITIONAL CLASSROOMS	BUT FINDINGS FROM COGNITIVE SCIENCE SHOW OTHER REQUIREMENTS FOR DEEP LEARNING
• Class material is not related to what students already know. Teacher: *"Igneous rocks are…."*	• Learners relate new understandings to what they already know and believe. Teacher: *"Have any of you seen granite countertops on TV home shows or maybe you have one in your house? What do they look like…?"*
• Class material presented and learned as disconnected bits of knowledge. Teacher: *"The definition of metamorphic rocks is…."*	• Learners integrate and interconnect their knowledge in expanding conceptual systems. Teacher: *"We already have learned about two kinds of rocks. Janay brought rock samples from her trip to Colorado. We also learned last week about how the earth has changed over the centuries, with some ocean floors becoming land areas. Today we will learn about how marble and diamonds…."*
• Lessons involve memorizing facts and doing procedures without understanding how or why. Teacher: *"To divide fractions, invert and multiply…."*	• Learners search for patterns and recognize or invent underlying principles. Teacher: *"Remind me what it means to divide…. Ok, so 3/4 divided by 1/2 means how many sets of what are in…?"*
• Knowledge is owned by an authority (e.g., textbook). Learners have trouble understanding ideas that are not straight from the book or explained in the same way. Teacher: *"What does your textbook say about…?"*	• Learners evaluate new ideas, even if not in the text, and integrate them into their thinking. Teacher: *"On TV yesterday there was a story about a new drug that is effective in curing 1 out of 8 cases of…. What is the probability of a cure?"*
• Authorities and experts are the source of unchanging and accurate facts and procedures. Teacher: *"Scientists agree…."*	• Learners understand that knowledge is socially constructed by people, so ideas require critical examination. Teacher: *"Here are brief summaries of two positions about climate change. How can we assess the evidence for each position?"*
• Learning is for reproduction instead of thinking about the purpose of learning and the best strategies for that purpose. Teacher: *"This will be on the test."*	• Learners think about why they are learning, monitor their understanding, and reflect on their own learning processes. Teacher: *"How could you use this concept in your own life? How can you tell if you are understanding it?"*

Source: Based on Sawyer, R. K. (2006). The new science of iearning. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (p. 4). Cambridge University Press.

Spiral curriculum
Bruner's design for teaching that introduces the fundamental structure of all subjects early in the school years and then revisits the subjects in more and more complex forms over time.

analogies, examples, and metaphors. This idea is consistent with Jerome Bruner's (1966) **spiral curriculum**, a structure for teaching that introduces the fundamental structure of all subjects—the "big ideas"—early in the school years and then revisits the subjects in more and more complex forms over time. Another example, the use of manipulatives in mathematics, allows students different ways to represent the quantities and processes in mathematics (Carbonneau et al., 2013).

SELF-AWARENESS AND REFLECTION ABOUT THE KNOWLEDGE CONSTRUCTION PROCESS. Constructivist approaches emphasize making students aware of their own role in constructing knowledge. The assumptions we make, our beliefs, and our experiences shape what each of us comes to "know" about the world. Different assumptions and different experiences lead to different knowledge, as we saw in Cluster 2 when we explored the

role of cultural differences in shaping knowledge. If students are aware of the influences that shape their thinking, they will be more able to choose, develop, and defend positions in a self-critical way while respecting the positions of others. Reflection is also necessary for knowledge construction. To develop deep conceptual knowledge, students need to reflect by thoughtfully analyzing their own work and progress.

STUDENT OWNERSHIP OF LEARNING. Constructivist approaches to learning emphasize students' direct involvement in and ownership of their own learning. Student ownership does not mean that the teacher abandons responsibility for instruction. Rather, teachers honor the knowledge that students bring to school and support students' agency and self-determination (Vossoughi et al., 2021). Students come into our classrooms filled with knowledge and beliefs about how the world works. Some of these preconceptions are right, some are partly right, and some are wrong. If learning opportunities do not begin with what the students "know," then the students might learn what it takes to pass a test, but their knowledge and beliefs about the world will not change, nor will their sense of ownership over what they have learned (Hennessey et al., 2012). As we'll see in Clusters 11 and 12, supporting ownership enhances students' self-efficacy, interest, and intrinsic motivation. Because the design of teaching is a central issue in this book, we will spend the rest of this cluster discussing examples of *ownership of learning* and *student-centered instruction*.

Designing Constructivist Learning Environments

Now that you understand the common elements of learner-centered, constructivist teaching approaches, how can you design environments that will put students at the center? Designing learning environments means translating our knowledge about learning and motivation into activities, assignments, assessments, and other resources for instruction (Belland et al., 2013). An interdisciplinary field often called the **learning sciences** encompasses research in psychology, education, computer science, philosophy, sociology, anthropology, neuroscience, and other fields that study learning and learning environments. Like educational psychologists, learning scientists are interested in the structures that support deep, robust knowledge construction in subjects like science, mathematics, and literacy.

Learning sciences
An interdisciplinary science of learning, based on research in psychology, education, computer science, philosophy, sociology, anthropology, neuroscience, and other fields that study learning.

Facilitating Deep Learning in a Constructivist Classroom

In constructivist classrooms, teachers are facilitators and learning environment designers. Even though the student is at the center of constructivist perspectives of learning, this does not mean that teachers are irrelevant or obsolete. Let's look at several other practices that teachers can use to facilitate students' active construction of knowledge.

SCAFFOLDING. Constructivist approaches include **scaffolding** to support students' developing expertise. Scaffolding is "the practice of providing students with support for meaning making and independent thinking" (Muhonen et al., 2016, p. 143). Deep understanding requires that students grapple with problems beyond what they are able to do independently—that is, problems in their zone of proximal development. As you saw in Cluster 3, in Vygotsky's theory, this is where learners need the support of others to construct new knowledge through assisted learning. In other words, higher-order thinking and learning have their origins in our social interactions (McCaslin & Vriesema, 2018). Look back at the grocery store conversation between Isaac and his mother. Notice how the mother used the melted ice cream on the kitchen counter—connecting to Isaac's experience and knowledge—to scaffold Isaac's understanding about the best method for grocery shopping.

Scaffolding
The practice of providing students with support for meaning making and independent thinking.

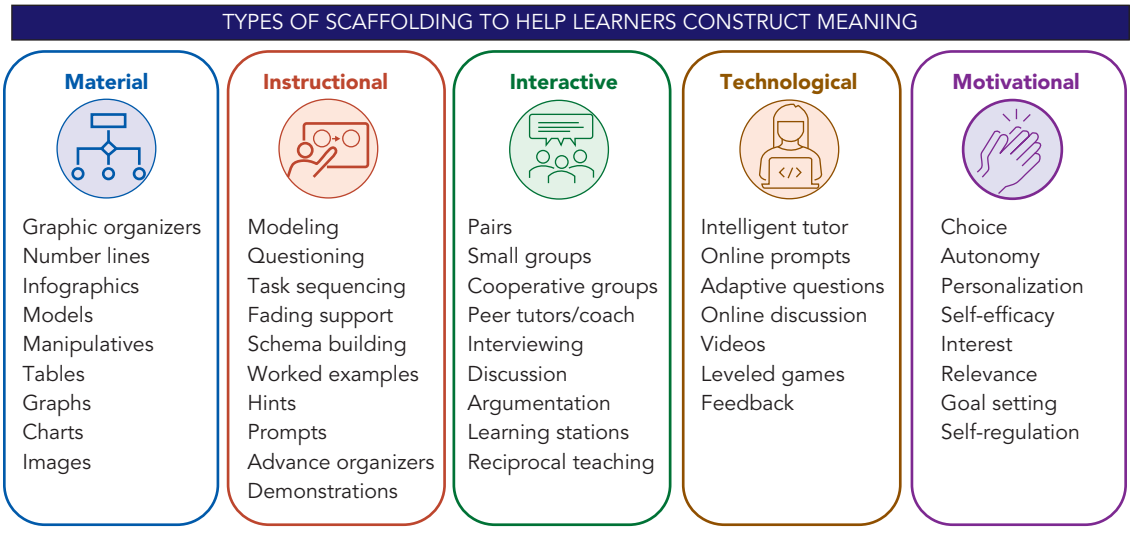
Scaffolding can be provided by teachers, peers, parents, and even multimedia resources. Scaffolding includes both *motivational* and *cognitive* support—helping students stay engaged and interested while also helping them move toward deeper learning (Belland, 2014; Wood et al., 1976). *Motivational scaffolding* includes recruiting the students' interests and enthusiasm to engage with the learning activity, maintaining the students' attention and redirecting when the students stray off task, supporting students' self-efficacy, and helping students manage their emotions if learning gets frustrating. These motivational supports are important for all students, but especially for students with learning challenges (Radford et al., 2015).

Cognitive scaffolding includes three characteristics (Radford et al., 2015; van de Pol et al., 2010). The teacher provides *contingency support* by constantly adjusting, differentiating, and tailoring responses to optimize students' understanding. The teacher gradually withdraws support as the students' understanding and skills deepen—a process known as *fading*. Eventually, the teacher *transfers responsibility* to students as they assume more and more responsibility for their own learning (van Merriënboer & Kirschner, 2013). During initial learning, teachers can begin with concrete examples and move to greater abstraction. For example, Emily Fyfe and her colleagues (2015) tested four ways of teaching math to first- through third-graders. The winning combination involved beginning with the most concrete representation (monkey and frog puppets who collected different numbers of stickers) and progressing to the most abstract (an addition equation with numbers and symbols). This fading technique helped all students learn more, even those who had greater prior knowledge in math.

Figure 10.1 provides examples of different sources of support that might help scaffold students' knowledge construction: materials, instructional support, interactive scaffolds, technology-mediated support, and motivational scaffolding. These methods often work in tandem (Belland, 2017; Palincsar et al., 2017). For example, Tzu-Jung Lin and her colleagues (2015) tested instructional supports for fourth-grade students' learning, such as prompting, modeling, and reminding. They analyzed over 35,000 exchanges during students' problem-based discussions in small groups. They found that teachers' prompts for relational thinking—encouraging logical reasoning, use of analogies, counterargument, alternative hypotheses, and elaborated clarifications—led to better student relational thinking. Once

Figure 10.1 Scaffolding Support to Help Learners Construct Meaning

Teachers can use various strategies to support students' deep learning. These involve selecting materials, using instructional approaches that facilitate understanding, designing interactive opportunities, using technology, and supporting student motivation.



the teacher coached one student to think more deeply, the relational thinking spread to other members of the group—they scaffolded each other (interactive scaffolding). Other effective teacher supports included praising students for using cognitive strategies and prompting the group to stay on task, not interrupt each other, take turns, and be sure everyone contributed (i.e., motivational scaffolding).

ADVANCE ORGANIZERS. One way to scaffold both learning and motivation is to begin a lesson or activity with an **advance organizer** (Melrose, 2013). This is the provision of introductory material broad enough to encompass all the information that will follow. The organizers can serve three purposes: They direct your attention to what is important in the upcoming material, they highlight relationships among ideas that will be presented, and they remind you of relevant information you already have.

Advance organizer
A statement or tool that introduces and summarizes concepts to help students organize the information they will learn about.

Advance organizers fall into two categories, comparative and expository (Mayer, 1984). *Comparative organizers* activate (bring into working memory) already-existing schemas. They remind you of what you already know but may not realize is relevant to the new topic being discussed. A comparative advance organizer for a history lesson on revolutions might be a statement that contrasts military uprisings with the physical and social changes involved in the Industrial Revolution; you could also compare the common aspects of the French, English, Mexican, Russian, Iranian, Egyptian, and American revolutions (Salomon & Perkins, 1989).

In contrast, *expository organizers* provide new knowledge that students will need to understand the upcoming information. In an English class, you might begin a large thematic unit on rites of passage in literature with a very broad statement of the theme and a brief analysis about why it has been so central in literature—something like "A central character coming of age must learn to know themself, often makes some kind of journey of self-discovery, and must decide what in the society is to be accepted and what should be rejected." Such an organizer might precede reading novels such as *The Adventures of Huckleberry Finn*.

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Advance Organizers (II, A3)
The advance organizer is an important element in many teacher-centered/expository approaches to instruction. Be able to explain the role of the advance organizer in these approaches and identify the basic types of organizers.

The general conclusion of research on advance organizers is that they do scaffold student learning, especially when the material to be learned is quite unfamiliar, complex, or difficult—as long as two conditions are met (Langan-Fox et al., 2000; Morin & Miller, 1998). First, for the organizer to be effective, the students must understand it—ask students to paraphrase the organizer to check their understanding. Second, the organizer must really be an organizer: It must indicate relations among the basic concepts and terms that will be used in the upcoming lesson. Concrete models, diagrams, concept maps, charts, timelines, or analogies seem to be especially good organizers (Robinson, 1998; Robinson & Kiewra, 1995).

FACILITATING THROUGH ASKING AND ANSWERING DEEP QUESTIONS. To identify the teaching practices that best support students' sensemaking, researchers reviewed studies conducted in classrooms of students from fourth grade through college in subjects as diverse as science, mathematics, history, and literature. The most frequent teacher practice shown to facilitate students' sensemaking involved asking deep questions that generated productive discussion (Fitzgerald & Palincsar, 2019). To be effective, you first must be sure that all your students have the necessary basic facts and knowledge to think deeply about. Then you can identify questions that prompt students to reason about underlying principles and big ideas in the content, make reasoned arguments, and provide evidence (Pashler et al., 2007). As the next example shows, graphic organizers and deep questions can make this easier.

Former high school teacher Doug Lombardi and his colleagues (2018) examined whether using an instructional scaffolding technique, called "model-evidence link," would improve high school students' ability to evaluate scientific evidence related to four science topics that have competing explanatory models—climate change, fracking and earthquakes, wetlands and land use, and the formation of the moon. Students were given a graphic organizer with two possible explanations about each phenomenon and four evidence statements, each with

corresponding "evidence text." Students were then asked to complete a sentence frame to evaluate and explain how well each piece of evidence supported each model:

Evidence # ____ ____ strongly supports Model # ____ because… _____
____ supports
____ contradicts
____ has nothing to do with

After evaluating the available evidence, students then rated the plausibility of each model from *greatly implausible* to *highly plausible*. The researchers found that this instructional scaffold helped make a complex and abstract topic more manageable and improved students' ability to evaluate the connection between evidence and alternative explanations for scientific phenomena.

It is not easy or natural to ask and answer deep questions. Students have to be supported as they learn these skills. Teachers can help improve the richness of students' discussions by asking students to clarify their points, drawing attention to explicit strengths in students' arguments, modeling target strategies, and checking for understanding (Wei et al., 2018). The *Guidelines: Facilitating Deep Questioning* give additional ideas.

GUIDELINES

Facilitating Deep Questioning

Encourage students to think aloud when speaking or writing their explanations as they study or discuss a topic.

Examples

1. Present a challenging story and ask students to think aloud to explain as they read the story, linking the story to personal experiences and prior knowledge.
2. Have students respond to each other's explanations and consider multiple explanations. "Are the reasons behind these explanations based on evidence? Are there other possible explanations?"
3. Where appropriate, use deliberative argumentation (Cluster 9) to reach a collaborative consensus about what is a good explanation. "What is the argument here? How good is the evidence? Does the argument connect with scientific principles? What is missing or weak in the argument?"

Ask questions that require an explanation, not just reciting facts or repeating from the text, to answer.

Examples

1. "How and why would the destruction of bees affect other life on our planet?" "How would the United States have changed if the other candidate had won the presidential elections in 1860, 1952, and 2020?"
2. Provide models of good, deep questions and teach students to distinguish between deep questions that require explanations like those above and superficial questions that only require a factual answer such as "What insect pollinates flowers?" "Who were the two main presidential candidates in 1860, 1952, and 2020?"

Ask questions that challenge students' prior beliefs and assumptions.

Examples

1. Ask questions that highlight puzzling or paradoxical situations, such as "Why is it good for a forest to periodically experience fires?"
2. Ask questions that make students defend their positions with facts and evidence. "What is the evidence for the position? Does this evidence rule out other possible explanations?"

Source: Based on Pashler, H., Bain, P., Bottge, B., Graesser, A., Koedinger, K., McDaniel, M., & Metcalfe, J. (2007). *Organizing instruction and study to improve student learning* (NCER 2007–2004). National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/20072004.pdf https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/20072004.pdf and Nussbaum, E. M. (2021). Critical integrative argumentation: Toward complexity in students' thinking. *Educational Psychologist, 56*(1), 1–17. https://doi.org/10.1080/00461520.2020.1845173

To repeat one of our favorite assertions, teachers are not irrelevant in constructivist classrooms. Rather, they are facilitators and learning environment designers. We have explored facilitation. Now let's examine instructional designs that draw heavily from constructivist principles: inquiry and problem-based learning and cognitive apprenticeships.

Inquiry-Based Learning

John Dewey described the basic **inquiry learning** format in 1910. Educators have developed many adaptations of this strategy, but the form usually includes the following elements (Dobber et al., 2017; Pedaste et al., 2015). An inquiry learning scenario typically begins with presentation of a puzzling event, question, or problem. The students then:

- Formulate hypotheses to explain the event or solve the problem,
- Investigate the problem and test hypotheses through planning, observation, experimentation, and data analysis,
- Draw conclusions, and
- Reflect on the original problem and the thinking processes needed to solve it.

Often the final state includes sharing findings with others. Many approaches can fall under the umbrella of inquiry-based learning and are named according to their primary focus and scope (e.g., to solve an ill-structured problem, to complete a multi-stage project).

This is a general picture of inquiry learning, but what is actually going on? Erin Furtak and her colleagues (2012) categorized the actual activities and processes in science inquiry as being *procedural* (hands-on, posing scientific questions, doing science procedures, collecting data, graphing or charting data), *epistemic* (i.e., related to building knowledge by drawing conclusions based on evidence, generating and revising theories), *conceptual* (connecting to students' prior knowledge, eliciting students' mental models and ideas), or *social* (participating in class discussions, arguing and debating ideas, giving presentations, working collaboratively). When the researchers analyzed 37 studies conducted from 1996 to 2006 that compared inquiry approaches with the traditional teaching of science, they found that the greatest impact on student learning came when the inquiry approach included epistemic activities or a combination of epistemic, procedural, and social activities. So having students collaborate to do hands-on scientific procedures, gather and represent data, draw conclusions, debate ideas, and make presentations was more effective than traditional teacher-centered approaches.

Throughout these phases of inquiry, teacher guidance and scaffolding were important. Just letting the students work completely on their own doing experiments was not effective (Furtak et al., 2012). What kind of guidance? Teachers provide *metacognitive support* by helping students think and act like scientists and monitor their progress, *conceptual support* by providing information related to the topic, and *social support* by helping students develop equitable collaborative skills (Dobber et al., 2017). Learners who are young or inexperienced might need additional supports, such as constraints on the scope of the inquiry and frequent prompts or explanations. Even though inquiry-based learning puts students in the driver's seat as investigators, teacher guidance is directly associated with greater learning (Lazonder & Harmsen, 2016).

EXAMPLES OF INQUIRY. Let's see how teachers might use the principles of inquiry-based learning to help elementary school students learn about communication (see Figure 10.2; Hapgood et al., 2004; Palincsar et al., 2001). The teacher first asks this general question: "How and why do humans and animals communicate?" Next, the teacher poses several specific focus questions: "How do whales communicate?" "How do gorillas communicate?" The focus questions have to be carefully chosen to guide students toward important understandings. One key idea in understanding animal communication is the relationships among the animals' structures (e.g., large ears or echolocators), survival functions (e.g., find food, avoid predators), and habitat (e.g., listening while navigating in the dark). Thus, focus questions must address meaningful differences; questions about animals with the same

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Inquiry Learning (II, A2, 3)

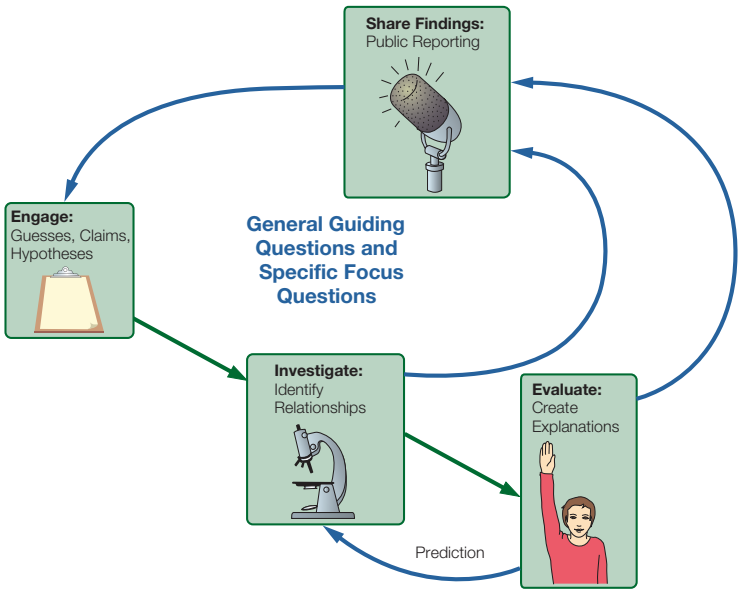
Inquiry learning is a student-centered approach to learning that predates many "traditional" forms of instruction. Describe the basic structure of this approach to learning. What are its strengths and limitations? What roles does the teacher have?

Inquiry learning

Approach in which the teacher presents a puzzling situation or question and students solve the problem by gathering data and testing their conclusions.

Figure 10.2 A Model to Guide Teacher Thinking About Inquiry-Based Science Instruction

The straight lines show the sequence of phases in instruction, and the curved lines show cycles that might be repeated during instruction.



Source: Based on "Designing a community of practice: Principles and practices of the GisML community," by A. S. Palincsar, S. J. Magnusson, N. Marano, D. Ford, and N. Brown. (1998). *Teaching and Teacher Education, 14,* p. 12. Adapted with permission from Elsevier.

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Discovery Learning (I, A1)

Many teachers, especially in mathematics and science, believe that meaningful learning in their content areas is best supported by discovery learning. Be prepared to answer questions about the assumptions, techniques, strengths, and limitations of this instructional strategy.

kinds of structures or habitats would not be good focus points for inquiry (Magnusson & Palincsar, 1995).

The next phase is to engage students in the inquiry, perhaps by playing different animal sounds and having students make guesses and claims about communication. Then the students conduct investigations—both firsthand (e.g., measuring the size of cats' eyes and ears in relation to their bodies) and secondhand (e.g., consulting a website or veterinarian). The students begin to identify patterns. The curved lines in Figure 10.2 show that students might go through several cycles of investigating, identifying patterns, and reporting results before moving on to constructing explanations and making final reports. Notice that inquiry teaching involves plenty of scaffolding that allows students to learn content and process at the same time. In addition, students learned the inquiry process itself—how to solve problems, evaluate solutions, debate ideas, and think critically.

Problem-based learning

Students are confronted with a problem that launches their inquiry as they collaborate to find solutions and learn valuable information and skills in the process.

PROBLEM-BASED LEARNING. One inquiry-based approach that grew out of research on expert knowledge in medicine is problem-based learning (Belland, 2011). In **problem-based learning**, students work in groups to confront a real-world, ill-structured problem that has no single correct solution (Belland et al., 2013; Lisette et al., 2014). The goal is for students to develop knowledge that is useful and flexible, not inert. Inert knowledge is information that is memorized but seldom applied (Whitehead, 1929). *Project-based learning* is similar to problem-based learning, but the projects extend over a longer period of time and may involve multiple problems along the way.

The phases of problem-based learning are similar to those followed in inquiry. During the first phase, *initial problem discussion*, the students identify and analyze the problem based on the facts from the scenario and then determine what they already know. It soon becomes clear that the students will need more information, so they identify learning issues. These questions guide the next phase—*individual research* on the learning issues. After the individual research phase, students return to their groups to *report* their research results and *collaborate* to find solutions. As they suggest hypotheses, apply their new knowledge, and evaluate their problem solutions, they may recycle to research again if necessary and finally reflect

on the knowledge and skills they have gained. Throughout the entire process, students are not alone or unguided. Their thinking and problem solving are scaffolded by the teacher, online resources, models, coaching, expert hints, guides and organizational aids, or other students in the collaborative groups—so working memory is not overloaded. For example, as students work, they may have to fill in a diagram that helps them distinguish between "claims" and "reasons" in a scientific argument or create a shared document divided into four sections where they list *facts, ideas, learning issues*, and *action plans* (Hmelo-Silver, 2003, Hmelo-Silver et al., 2007).

In true problem-based learning, the problem is real and the students' actions matter. For example, during the 2010 *Deepwater Horizon* oil spill, many teachers used the problem as a springboard for learning. Their students researched how this spill compared to others in size, location, expense, causes, and attempted solutions. What could be done? How do currents and tides play a role? What locations, businesses, and wildlife are in the greatest danger? What will be the short-term and long-term financial and environmental impacts? What actions can students take to play a positive role? A number of teachers blogged about using the oil spill in problem-based learning and collected resources for other teachers (see http://www.edutopia.org and search for "oil spill" to find more resources). Let's look at these phases more closely as they might take place in an upper-level science class (Klein & Harris, 2007).

1. The cycle begins with an *intriguing challenge* to the whole class. For example, in biomechanics it might be "Assume you are a living cell in a bioreactor. What things will influence how long you live?" or "Your grandmother is recovering from a broken hip. In which hand should she hold the cane to help her balance?" The question is framed in a way that makes students bring to bear their current knowledge and preconceptions.
2. Next, students *generate ideas* to compile what they currently know and believe and what they need to know more about using individual, small-group, or whole-group brainstorming or other activities.
3. Students research the topic individually. *Multiple perspectives* are added to the process in the form of outside experts (live, on video, or from texts), websites, magazine or journal articles, or podcasts on the subject.
4. Students go deeper to *research and revise*. They consult more sources or listen to class lectures, all the while revising ideas and perhaps journaling about their thinking.
5. Students *test their mettle* by getting feedback from other students or the teacher about their tentative conclusions. Some formative (ungraded) tests might check their understanding at this point.
6. Students come back to their groups, discuss conclusions, and *go public* with their final conclusions and solutions in the form of an oral presentation, poster/project, or final exam.

The teacher's role in problem-based learning is to identify engaging problems and appropriate resources; orient students to the problem by describing objectives and rationales; organize the students' work by helping them set goals and define tasks; support, coach, and mentor students as they gather information, craft solutions, and prepare artifacts (e.g., models, reports, videos, presentation slides, portfolios); and support student reflection on their own learning outcomes and processes (Arends & Kilcher, 2010).

DOES INQUIRY-BASED INSTRUCTION IMPROVE LEARNING? Does using inquiry projects or problem-based learning activities lead to greater achievement? Researchers have debated this question for years. Some research results say "yes" (Belland et al., 2013; Chen & Yang, 2019; Furtak et al., 2012; Loyens et al., 2015), and other results suggest that they do not (Jerrim et al., 2019). The mixed evidence is partly a question of what is being learned, what type of inquiry-based approach is being used, and how learning outcomes are being measured (Hung et al., 2019). Not every educational psychologist agrees that inquiry-based learning is valuable, at least for all students, as you can see on the next page in the *Point/Counterpoint: Are Teaching Approaches to Support Inquiry- and Problem-Based Learning Effective?*

POINT/COUNTERPOINT: Are Teaching Approaches to Support Inquiry- and Problem-Based Learning Effective?

Teaching for inquiry- and problem-based learning is very appealing, but is it effective? Specifically, do inquiry- and problem-based teaching approaches lead to deep understanding and robust knowledge for most students?

Point

Inquiry-based learning is overrated. Paul Kirschner and his colleagues were clear and critical in their article in the *Educational Psychologist*. Even the title of the article was blunt: "Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching." They argued:

> Although unguided or minimally guided instructional approaches are very popular and intuitively appealing, the point is made that these approaches ignore both the structures that constitute human cognitive architecture and evidence from empirical studies over the past half-century that consistently indicate that minimally guided instruction is less effective and less efficient than instructional approaches that place a strong emphasis on guidance of the student learning process. (Kirschner et al., 2006, p. 75)

These respected researchers (and others more recently) cited decades of research demonstrating that unguided discovery/inquiry and problem-based learning are ineffective, especially for students with limited prior knowledge (Kalyuga, 2011; Klahr & Nigam, 2004; Tobias, 2010). A nationally representative study of 15-year-old science students in England similarly showed that, regardless of students' prior achievement levels, "High levels of inquiry or unguided inquiry have no relationship with attainment at all" (Jerrim et al., 2019, p. 42). Louis Alfieri and his colleagues (2011) examined the results from 108 studies going back over 50 years and found that explicit teaching was more beneficial than unassisted discovery, especially for studies published in the most well-rated journals. Their conclusion: "Unassisted discovery generally does not benefit learning" (p. 12). Similar evidence from over 300 studies conducted between 1966 and 2016 showed that direct instruction led to higher academic achievement (Stockard et al., 2018). The researchers concluded that direct instruction works because it provides learners with clear, unambiguous examples that ensure understanding. Students do not waste time feeling confused or, worse, reaching false conclusions from having too little guidance. Also, you may remember from Cluster 5 that a thorough review by the leading researchers studying specific learning disabilities concluded, "There is little evidence that children with SLDs benefit from discovery, exposure, or constructivist instructional approaches" (Grigorenko et al., 2020, p. 48).

But what about problem-based learning in particular? Much of the research on problem-based learning has taken place in medical schools, and results have been mixed (Hung et al., 2019). For example, one meta-analysis showed that, although students learning through problem-based instruction were better at practical medical skills, graduated sooner, and reported greater well-being, they had relatively small gains in their medical knowledge (Schmidt et al., 2009).

Counterpoint

Approaches that focus on inquiry can be powerful tools for learning. When problem-based learning was used in science classes in Grades K–8, students' science achievement and conceptual development improved (Merritt et al., 2017). Second-grade students whose teachers were randomly assigned to implement project-based approaches in social studies and literacy showed more than five months of learning gains compared to their peers in

traditional learning formats (Duke et al., 2021). In a study of almost 20,000 middle school students in a large urban district who used inquiry-based materials, those who participated in inquiry learning had significantly higher passing rates on standardized tests. African American boys especially benefited from these methods (Geier et al., 2008). In studies of high school economics and mathematics, research favors problem-based approaches for learning more complex concepts and solving multistep word problems. Advanced Placement (AP) U.S. government and environmental science students who were randomly assigned to "Knowledge in Action" inquiry-based projects earned higher AP scores compared to students who received traditional instruction (Saavedra et al., 2021). Several other studies have pointed to increases in student engagement and motivation with inquiry learning (Hmelo-Silver et al., 2007), as long as the learning is supported and students have adequate background knowledge.

In sum, Cindy Hmelo-Silver (2004; Hmelo-Silver et al., 2007) reviewed the research and found good evidence that problem-based learning supports the construction of flexible knowledge and the development of problem-solving and self-directed learning skills, but less evidence indicates that participating in problem-based learning is intrinsically motivating or that it teaches students to collaborate.

Beware of Either/Or

The difference among effective and ineffective inquiry, project-based learning, and problem-based learning seems to come down to completely unguided discovery versus guided, supported, and well-scaffolded learning. Alfieri and his colleagues (2011) concluded:

> [O]ptimal approaches should include at least one of the following: (a) guided tasks that have scaffolding in place to assist learners, (b) tasks requiring learners to explain their own ideas and ensuring that these ideas are accurate by providing timely feedback, or (c) tasks that provide worked examples of how to succeed in the task. (p. 13)

But to make the matter a bit more complicated, evidence shows that the value of guidance and feedback can depend on the student's prior knowledge or age. For example, in learning mathematics problem-solving strategies, students with little knowledge benefited from feedback as they explored possible solutions, but students with some knowledge benefited more from just exploring solutions independently without feedback and guidance (Fyfe et al., 2012). On the other hand, first-grade students learned certain basic mathematics reasoning skills better during unguided discovery learning via computer than from direct instruction—perhaps an example of the value of unstructured play for young children (Baroody et al., 2013).

For an example of project-based learning successes, check out http://pblworks.org for videos and resources.

BEING SMART ABOUT INQUIRY LEARNING. You don't have to choose between inquiry and content-focused methods. The best approach in K–12 schools may be a balance of content-focused and inquiry or problem-based methods (Lisette et al., 2014). For example, third- and fourth-grade students who were learning how to use the "control of variables strategy" when designing science experiments were randomly assigned to different teaching approaches: minimal guidance, some direct guidance, teacher modeling and direct guidance, or teacher modeling. Although all students improved, students who received direct guidance and modeling from their teachers performed the best (Martella et al., 2020). The bottom line is that inquiry learning can be effective for helping students learn to solve ill-structured problems if appropriate scaffolding and teacher facilitation are available. Teachers can select and limit the number of research materials for the individual research phase, provide models of questions and answers about the learning issues identified, offer guidance about the characteristics of a good solution, and give feedback along the way (Belland, 2017; Lisette et al., 2014).

Remember that strong inquiry learning approaches support learners' motivation and identity development in addition to their learning—which should be the goal of all instruction. The Buck Institute for Education (2019) recommends that inquiry designs include support for student voice and choice and connect authentically to students' "own concerns, interest, cultures, identities, and issues in their lives" (p. 3). Participatory designs that directly involve students foster the co-evolution of students' learning and identities (Hand & Gresalfi, 2015). You should always encourage learners to connect what they are learning to their out-of-school interests, cultures, and funds of knowledge (Glazewski & Ertmer, 2020). Above all, teachers should remember that using clever projects is not helpful if content standards are unmet, learning is superficial, or students are not engaged in disciplinary thinking (Grossman et al., 2019).

Another constructivist approach that relies on scaffolding and student participation is cognitive apprenticeships.

Cognitive Apprenticeships

Over the centuries, apprenticeships have proved to be an effective form of education. By working alongside a master and perhaps other apprentices, young people have learned many skills, trades, and crafts. Knowledgeable guides provide models, demonstrations, and corrections as well as a personal bond that is motivating. The performances required of the learner are real and important and grow more complex as the learner becomes more competent (Collins, 2006; Hung, 1999; Linn & Eylon, 2006). With *guided participation* in real tasks comes *participatory appropriation*—students appropriate the knowledge, skills, and values involved in doing the tasks (Rogoff, 1995, 1998). In addition, both the newcomers to learning and the old-timers contribute to the community of practice by mastering and remastering skills—and sometimes improving these skills in the process (Lave & Wenger, 1991).

Barbara Rogoff and her colleagues (2016) have suggested that, in contrast to the assembly-line model of learning common in our recent history of formal schooling, the archives of human history are full of culturally embedded forms of learning in the world beyond school. These forms often involve something Rogoff (2016) has called "Learning by Observing and Pitching In"—a type of apprenticeship known to indigenous communities in which learning takes place in families and communities with the goal of enabling learners' increasing participation and contribution to the community over time.

How can schools adapt some of the features of apprenticeships? Rather than (or in addition to) showing learners how to sculpt or dance or build a cabinet, apprenticeships could focus on cognitive objectives such as reading comprehension, writing, or mathematical problem solving. There are many **cognitive apprenticeship** models, but most share these six features:

Cognitive apprenticeship
A relationship in which a less experienced learner acquires knowledge and skills under the guidance of an expert.

- Students observe an expert (usually the teacher) *model* the performance.
- Students get external support through *coaching* or tutoring (including hints, tailored feedback, models, and reminders).
- Students receive conceptual *scaffolding*, which is then gradually faded as the student becomes more competent and proficient.
- Students continually *articulate* their knowledge—putting into words their understanding of the processes and content being learned.
- Students *reflect* on their progress, comparing their problem solving to an expert's performance and to their own earlier performances.
- Students are required to *explore* new ways to apply what they are learning—ways that they have not practiced at the master's side.

As students learn, they are challenged to master more complex concepts and skills and to perform them in many different settings.

How can teachers provide cognitive apprenticeships? Developing activities that remove traditional hierarchies from learning is a good start. Promoting intergenerational learning or working with a community member with more expertise fosters "relational equity" and can provide many of the qualities of an apprenticeship (DiGiacomo & Penuel, 2018). At the STEAM Academy in Lexington, Kentucky, public high school students take part in community-based internships in which they learn a craft or a discipline. Some high schoolers spend part of their school day working in research labs or design studios on the University of Kentucky's campus alongside undergraduate and graduate students and their professors. The internship culminates in a public presentation of findings. Projects have addressed diverse topics such as community recycling, radio production, horse grooming, organic gardening, architecture, and financial planning. Many levels of expertise are evident in these participatory apprenticeships, so students can move at a comfortable pace but still have the model of a master available. School-based apprenticeships can involve multi-age groups or community volunteers and parents who can demonstrate a variety of cultural practices.

Another advantage of apprenticeships is that they help build skills in collaborative problem solving (Graesser et al., 2018). Key word—collaborative.

Module 31 Summary

Cognitive and Social Constructivism (pp. 420–427)

Describe two kinds of constructivism. Constructivism is more a *philosophy* about knowledge than a scientific theory of learning. *Cognitive* constructivists such as Piaget are concerned with how individuals make sense of their world based on individual knowledge and beliefs. *Social* constructivists such as Vygotsky believe that social interaction, cultural tools, and activity shape individual development and learning. By participating in a broad range of activities with others, learners appropriate the outcomes produced by working together; they acquire new strategies and knowledge of their world.

In what ways do constructivist views differ about knowledge sources, accuracy, and generality? Constructivists debate whether knowledge is constructed by mapping external reality, by adapting and changing internal understandings, or by an interaction of external forces and internal understandings. Most psychologists believe there is a role for both internal and external factors but differ in how much they emphasize one or the other. Also, there is discussion about whether knowledge can be constructed in one situation and applied to another or whether knowledge is situated—specific and tied to the context in which it was learned.

What is meant by thinking as enculturation? Enculturation is a broad and complex process of acquiring knowledge and understanding consistent with Vygotsky's theory of mediated learning. Just as our home culture taught us lessons about the use of language, the culture of a classroom can teach lessons about thinking by giving us models of good thinking, providing direct instruction in thinking processes, and encouraging practice of those thinking processes through interactions with others.

What are some common elements in most constructivist views of learning? Even though there is no single constructivist theory, many constructivist approaches recommend complex, challenging learning environments and authentic tasks; social negotiation and co-construction; multiple perspectives and representations of content; understanding that knowledge is constructed; and student ownership of learning.

Designing Constructivist Learning Environments (pp. 427–437)

What are some basic assumptions to guide the design of learning environments? Key assumptions to guide design are that experts develop deep conceptual knowledge, learning comes from the learner, creating learning environments is the responsibility of the school, students' prior knowledge is key, and reflection is a critical component of learning. These common assumptions enable researchers from a variety of disciplines to address the same issues of learning from a variety of perspectives.

What is scaffolding? Scaffolding involves making connections between teachers' cultural knowledge and the everyday experience and knowledge of the student by providing supports for learning—prompts, cues, needed information, coaching, and so on. Scaffolding includes both *motivational* and *cognitive* support—helping students stay engaged and interested while also helping them move toward deeper learning. Motivational support includes supports such as connecting to student interests, redirecting attention, and coping with frustration. Cognitive supports include tailoring instruction, fading supports, and gradually transferring responsibility to students.

How can teachers facilitate using advance organizers and deep questioning? Advance organizers facilitate instruction by providing introductory material broad enough to encompass all the information that will follow. The organizers can serve three purposes: They direct your attention to what is important in the upcoming material, they highlight relationships among ideas that will be presented, and they remind you of relevant information you already have. Teachers also can facilitate learning by training students in how to ask and answer deep questions when they read, listen to a lecture, or participate in class discussions. These questions prompt students to reason about underlying principles and big ideas in the content, make reasoned arguments, and provide evidence.

What are some examples of inquiry methods and problem-based learning? Inquiry approaches begin when the teacher presents a puzzling event, question, or problem. The students ask questions (only yes–no questions in some kinds of inquiry) and then formulate hypotheses to explain the event or solve the problem, collect data to test the hypotheses about casual relationships, form conclusions and generalizations, and reflect on the original problem and the thinking processes needed to solve it. Problem-based learning may follow a similar path, but the learning begins with an authentic problem—one that matters to the students. The goal is to learn math or science or history or some other important subject while seeking a real solution to a real problem.

Describe features that most cognitive apprenticeship approaches share. Students observe an expert (usually the teacher) model the performance; get external support through coaching or tutoring; and receive conceptual scaffolding, which is then gradually faded as the students become more competent and proficient. Students continually articulate their knowledge—putting into words their understanding of the processes and content being learned. They reflect on their progress, comparing their problem solving to an expert's performance and to their own earlier performances. Finally, students explore new ways to apply what they are learning—ways that they have not practiced at the master's side.

MODULE 32 Collaboration and Cooperation in Teaching and Learning

Learning Objective 10.4 Appropriately incorporate collaboration and cooperative learning in your classes.

Collaboration and Cooperation

Even with all the concern today about test performance and international comparisons, schooling has always been about more than academic learning. Of course, academics are the prime directive, but the ability to collaborate to solve problems is a core 21st-century skill (Fiore et al., 2018). At the turn of the century, Elliot Aronson (2000) observed that:

> Most corporations are looking for employees who are not only good at the mastery of a particular set of academic skills but who also have the ability to work harmoniously with a wide variety of coworkers as a cooperative team, to demonstrate initiative and responsibility, and to communicate effectively. (p. 91)

Aronson may not have realized that rapid digital advances would bring collaborative communities to our own fingertips. From Zoom to Facetime to Google, much of our interactive communication takes place online; we will examine this in detail later in this cluster.

Big shifts in the types of interactive environments available to learners have not stopped researchers from being interested in what occurs when students work together in groups. The terms *group work*, *collaboration*, and *cooperative learning* often are used as if they mean the same thing. Certainly there is some overlap, but there are important distinctions as well.

Learning in Groups

Stop & Think What comes to mind when you hear "group work"? In your own learning experience, when did group-based learning help you the most? When did it help the least?

Many school activities can be completed in groups. Group work simply refers to several people working together on an assigned learning task—they may or may not be cooperating (Cohen & Lotan, 2014). For example, students can divide up the territory where they will be conducting a local survey and discuss how people feel about the plan to build a new entertainment complex that will bring more fun activities but more traffic. Or, to learn 10 new terms in a biology class, students can create a shared Google slideshow where they each define two terms with words and graphics to "teach" one another the definitions.

Group work can be useful, but, as we will see, true cooperative learning requires much more than simply putting students in groups and dividing up the work. For example, Angela O'Donnell and Jim O'Kelly, two of Anita's colleagues from Rutgers University, described a teacher who claimed to be using "cooperative learning" by asking students to work in pairs to write a paper, each taking one part. Unfortunately, the teacher allowed the students no time to work together and provided no guidance or preparation in cooperative social skills. Students got a grade for their individual part and a group grade for the whole project. One student received an A for his part but a C for the group project because his partner earned an F; he never turned in any work. So one student was punished with a C for a situation he could not control while the other was rewarded with a C for doing no work at all. This was not collaborative or cooperative learning—it wasn't even group work (O'Donnell & O'Kelly, 1994). How does this experience align with your group-based learning experiences?

GOALS OF GROUP WORK. Although the goals of group work can be to quickly accomplish a task by dividing labor, most teachers who assign group work hope that their students will collaborate with each other. **Collaboration** can be viewed as a philosophy about how to relate to others—how to learn and work (Panitz, 1996). Collaboration is a way of dealing with people that respects differences, shares authority, and builds on the knowledge that is distributed among other people. Collaborative learning has roots in the work of British teachers who wanted their students to respond to literature in more active ways as they learned. **Cooperation**, on the other hand, is a way of working with others to attain a shared goal (Gillies, 2003). Cooperative learning has American roots in the work of psychologists John Dewey and Kurt Lewin. You could say that *cooperative* learning is one way to *collaborate* in schools.

Some scholars believe that learning to successfully collaborate is an important skill in itself and necessary for success in the future (Lawlor et al., 2018). Other educators claim that collaboration is a means for learning academic material—so we could say the two goals are *learning to collaborate* and *collaborating to learn* (Kuhn, 2015). Of course, teachers don't have to choose. Both goals are valuable.

WHAT CAN GO WRONG: MISUSES OF GROUP LEARNING. Without careful planning and monitoring by the teacher, group interactions can hinder learning and reduce rather

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Characteristics of Cooperative Learning (II, A2)

Many instructional strategies labeled as *cooperative learning* lack one or more qualities that are essential components of such techniques. List those essential qualities, and explain the role of each.

Collaboration

A philosophy about how to relate to others—how to learn and work together.

Cooperation

Way of working with others to attain a shared goal.

than improve social relations in classes (Gillies & Boyle, 2011; Kuhn, 2015). For example, if there is pressure in a group for conformity, interactions can be unproductive and unreflective. Without feedback about accuracy, misconceptions might be reinforced, or the worst, not the best, ideas may be combined to construct a superficial or even incorrect understanding (Asterhan et al., 2014). Students who work in groups but arrive at wrong answers may be more confident that they are right—a case of "two heads are worse than one" (Puncochar & Fox, 2004). Also, social or cultural status might interfere with group processes. The ideas of low-status students may be ignored or even ridiculed while the contributions of high-status students are accepted and reinforced, regardless of the merit of either set of ideas (Anderson et al., 1997; Gillies, 2014). Mary McCaslin and Tom Good (1996) mentioned several other possible disadvantages of group learning:

- Students often value the process or procedures over the learning. Speed and finishing early take precedence over thoughtfulness and learning.
- Socializing and interpersonal relationships may take precedence over learning.
- Students may simply shift dependency from the teacher to the "expert" in the group; learning is still passive, and what is learned can be wrong.
- Status differences may be increased rather than decreased. Some students learn to "loaf" because the group progresses with or without their contributions. Others become even more convinced that they are unable to understand without the support of the group.

Deanna Kuhn (2015) sums up the situation: "It is not enough to put individuals in a context that allows collaboration and expect them to engage in it effectively. Intellectual collaboration is a skill, learned through engagement and practice and much trial and error" (p. 51). Unless teachers pay careful attention to task design and support for cooperation, their students probably won't benefit from collaborative activities (van Leeuwen & Janssen, 2019). What are the features of a truly cooperative learning environment? How can you ensure that all learners benefit? We turn to that next.

Learning Through Cooperation

Throughout this book, you have read about different theories of learning that would support the use of cooperative learning, but for different reasons (O'Donnell, 2002, 2006). Information processing theorists point to the value of group discussion in helping participants rehearse, elaborate, and expand their knowledge. As group members question and explain, they have to organize their knowledge, make connections, and review—all processes that support information processing and memory. Advocates of a Piagetian perspective suggest the interactions in groups can create the cognitive conflict and disequilibrium that lead individuals to question their understanding and try out new ideas (Brown & Palincsar, 2018). By encountering people who hold opposing views, learners are left to reevaluate their own perspectives—or, as Piaget (1985) said, "to go beyond [their] current state and strike out in new directions" (p. 10). Those who favor a sociocultural constructivist approach, such as Vygotsky's theory, suggest that social interaction is important for learning because higher mental functions such as reasoning, comprehension, and critical thinking originate in social interactions and are then appropriated and internalized by individuals (McCaslin & Vriesema, 2018). Students can accomplish mental tasks with social support before they can do them alone. Thus, cooperative learning provides the social support and scaffolding students need to move learning forward. To benefit from these dimensions of cooperative learning, groups must be cooperative—all members must participate.

Cooperative learning
Situations in which elaboration, interpretation, explanation, and argumentation are integral to the activity of the group and where learning is supported by other individuals.

David and Roger Johnson (2009a), two of the founders of cooperative learning in the United States, define formal **cooperative learning** as "students working together, for one class period to several weeks, to achieve shared learning goals and complete jointly specific

Figure 10.3 Five Elements of Cooperative Learning Groups

David and Roger Johnson (2009a) described five elements foundational to successful cooperative learning groups.



tasks and assignments" (p. 373). The Johnson brothers described five elements that define true cooperative learning groups, which are depicted in Figure 10.3.

In true cooperative groups, group members experience *positive interdependence*. The members believe they can attain their goals only if the others in the group attain their goals as well, so they need each other for support, explanations, and guidance. *Promotive interaction* means that group members encourage and facilitate each other's efforts. They usually interact face-to-face and close together, not across the room, but they also could interact remotely with others around the world. Even though they feel a responsibility to the group to work together and help each other, students must ultimately demonstrate learning on their own; they are held *individually accountable* for learning, often through individual tests or other assessments.

Collaborative and social skills are necessary for effective group functioning. These skills include paying attention and listening even if you don't agree, disagreeing and sharing your ideas respectfully, taking turns, doing your fair share, working with partners even if they are not your choice, asking for/providing help, giving constructive feedback, reaching consensus, involving every member, encouraging and praising, controlling emotions and frustrations, cheering up partners, and admitting mistakes, among other skills (Ladd et al., 2014a, 2014b). These skills do not necessarily come naturally, even for socially capable students. Often they must be taught and practiced before the groups tackle a learning task (see tips for promoting social and emotional learning in Clusters 4 and 11).

Finally, members monitor *group processes* and relationships to make sure the group is working effectively and to learn about the dynamics of groups. They take time to ask, "How are we doing as a group? Is everyone working together? What should we do more or less of next time?" Engaging in these cooperative learning practices involves **co-regulated learning**—the process of distributing the responsibility for regulating learning, motivation, behaviors, and emotions to all members of the group (Hadwin et al., 2018). There is a lot to co-regulate in a group process (I am thinking of a long faculty meeting I had recently!). Co-regulation might involve helping each other clarify goals, follow procedures, manage disagreements, remain on task, check in on progress, seek tools and resources,

Co-regulated learning
Process of sharing the regulation of learning, behaviors, motivation, and emotions among group members.

and, during remote meetings, monitor the Zoom chat, just to name a few (McCaslin & Vriesema, 2018).

EFFECTS OF COOPERATIVE LEARNING. Cooperative learning has a long history in American education, moving in and out of favor over the years. Today, our evolving, interconnected society coupled with the complex problems we face require a steady commitment to cooperative learning and collaboration (Fiore et al., 2018). Cooperative learning approaches are now used "in schools and universities throughout most of the world in every subject area and from preschool through graduate school and adult training programs" (D. Johnson & R. Johnson, 2009a, p. 365). Research supports this wide use. Despite some inconsistencies, the majority of the studies on cooperative learning indicate that truly cooperative groups have positive effects—from preschool to college—on students' empathy, tolerance for differences, feelings of acceptance, friendships, self-confidence, awareness of the perspectives of others, higher-level reasoning, problem solving, decision making, essay writing, and even school attendance (Galton et al., 2009; Gillies & Boyle, 2011; Inns & Slavin, 2018; Kyndt et al., 2014; Roseth et al., 2008; Solomon et al., 2001).

Experimental evidence has strengthened these conclusions. Consider one study in which fifth-graders from 36 classes were randomly assigned to a Wolf Reintroduction and Management Learning Unit taught either in a collaborative group work format or through direct instruction (Zhang et al., 2016). Students who worked in collaborative groups met to discuss the "'big question'—whether the community should be permitted to hire professional hunters to kill wolves" (p. 201) and smaller questions related to it. Students assigned to direct instruction learned about wolves through whole-class discussion and activities. Students who learned collaboratively scored higher on the three outcomes related to decision-making skills: recognizing two sides of a dilemma, reasoning, and weighing the reasons by how important they were.

About 80% of elementary school teachers and 62% of middle school teachers use some form of peer learning on a regular basis (Ladd et al., 2014b). However, some evidence suggests that students around the globe are not gaining strong skills in collaborative problem solving. The Organisation for Economic Co-operation and Development (OECD, 2017) administered a computerized problem-solving simulation to test the collaborative problem-solving skills of 15-year-old students from 52 countries. Only 8% of students were top performers on the test. What can you do to help strengthen your students' collaboration skills?

TEACHER'S ROLE IN COOPERATIVE LEARNING. How can teachers encourage true cooperation and avoid the pitfalls of less cooperative group work? As with any instructional activity, to ensure successful cooperative learning, teachers have to plan *before*; monitor, support, and consolidate learning *during*; and reflect on learning *after* the cooperative learning activity, as shown in Table 10.3. We will examine the teacher's role more closely next.

Designing Cooperative Learning Tasks

Like so many other decisions in teaching, plans for using cooperative groups begin with a goal. What are students supposed to accomplish? What is the task? Is it a true group task—one that builds on the knowledge and skills of several students—or is the task more appropriate for individuals (Cohen, 1994; O'Donnell, 2006)? As we will see, tasks for cooperative groups can be more or less structured.

HIGHLY STRUCTURED, REVIEW, AND SKILL-BUILDING TASKS. Highly structured tasks include work that has specific answers—drill and practice, applying routines or procedures, answering questions from readings, computations in mathematics, and so on. A relatively structured task such as reviewing previously learned material for an exam might be well served by a structured technique such as *student teams achievement divisions* (STAD), in which teams of four students compete to determine which team's members can amass the greatest

Table 10.3 The Teacher's Role in Cooperative Learning

Here are some examples of teacher competencies needed for successful cooperative learning. The teacher plans, monitors, supports, consolidates, and finally reflects.

BEFORE THE ACTIVITY	DURING THE ACTIVITY			AFTER THE ACTIVITY
Plan/Design	*Monitor*	*Support*	*Consolidate*	*Reflect*
• Group composition • Goals/Tasks • Materials • Roles/Scripts • Instructions • Planned assessments	• Determining which interactions will lead to learning in this task • Watching for explanations, questions, challenges, shared information, elaboration, and affirmations	• Scaffolding and fading • Prompts, cues • Resources at different levels • Encouragement • Feedback • Praise • Guiding questions	• Class presentations • Compare/ contrast solutions • Whole-class discussion • Individual testing	Revisit learning goals and plans: • What did monitoring reveal? • Was the support appropriate? • Did students learn? • What changes should be made for the next time?

Source: Based on Kaendler, C., Wiedmann, M., Rummel, N., & Spada, H. (2015). Teacher competencies for the implementation of collaborative learning in the classroom: A framework and research review. *Educational Psychology Review, 27*, 505–536.

improvement over previous achievement levels (Slavin, 2017). Praise, recognition, or extrinsic rewards can enhance motivation, effort, and persistence under these conditions, and thus increase learning. Focusing the dialogue by assigning narrow roles also may help students stay engaged when the tasks involve practice or review.

ILL-STRUCTURED, CONCEPTUAL, AND PROBLEM-SOLVING TASKS. Ill-structured complex tasks have multiple answers and unclear procedures, requiring problem finding and higher-order thinking, which you learned about in Cluster 9. These ill-structured problems are true collaborative tasks—they are likely to require the resources (knowledge, skills, problem-solving strategies, creativity) of all the group members to accomplish. These tasks require more and higher-quality interactions than routine tasks if learning and problem solving are to occur (Cohen, 1994; Gillies, 2004; Gillies & Boyle, 2011).

As we have already seen, strategies that encourage extended and productive interactions are appropriate when the goal is to develop higher-order thinking, reasoning, and problem solving. In these situations, a tightly structured process, competition among groups for rewards, and rigid assignment of roles are likely to inhibit the richness of the students' interactions and to interfere with progress toward the goal. Open-ended techniques such as reciprocal questioning (Brown & Palincsar, 2018) and Jigsaw (Aronson, 2000) should be more productive because, when used appropriately, they encourage more extensive interaction and elaborative thought in situations where students are being exposed to complex materials. In these instances, the use of rewards may divert the group from the goal of in-depth cognitive processing especially if the goal becomes achieving the reward as efficiently as possible rather than supporting all group members' understanding (Roseth et al., 2019).

SOCIAL SKILLS AND COMMUNICATION TASKS. When the goal of collaborative learning is to enhance social skills or increase intergroup understanding and appreciation of diversity, the assignment of specific roles and functions within the group might support communication (Cohen, 1994; Kagan, 1994). In these situations, it can be helpful to rotate leadership roles so that all students have the opportunity to demonstrate and develop leadership skills. This structure enables all group members to distribute power and to experience the leadership capabilities of each individual (Miller & Harrington, 1993). Rewards probably are not necessary, and they may actually get in the way because the goal is to build community, a sense of respect, and responsibility for all team members. When the group's goal is to reach consensus, students learn more (Tenenbaum et al., 2020).

GIVING AND RECEIVING EXPLANATIONS. Students who ask questions, get answers, and attempt explanations are more likely to learn than students whose questions go unasked or unanswered. In fact, evidence shows that the more a student provides elaborated, thoughtful explanations to other students in a group, the more the *explainer* learns. (I, Ellen, never learned more about U.S. history than when I had to explain it to my fifth-grade students!) Yes, for deep learning, giving good explanations appears to be even more important than receiving explanations (O'Donnell, 2006). To explain an idea clearly, you have to organize the information, put it into your own words, think of examples and analogies (which connect the information to things you already know), and test your understanding by answering questions. These are excellent learning strategies (Fiorella & Mayer, 2016; Hoogerheide et al., 2019; King, 2002).

Good explanations are relevant, timely, correct, and elaborated enough to help the listener correct misunderstandings; the best explanations tell why (Webb et al., 2002; Webb & Mastergeorge, 2003). For example, in a middle school mathematics class, students worked in groups on problems like this:

> Find the cost of playing a video game for 20-minutes when the first minute costs $0.25 and each additional minute costs $0.11.

The level of explanation and help students gave to their peers was significantly related to learning; the higher the level, the more the learning. At the highest level, the helper told how to solve the problem and *why*. For example, a helper explaining the problem above might say, "OK, it is 25 cents for the first minute, then there are 19 minutes left and each of those minutes costs 11 cents, so you multiply 11 cents by 19. That equals $2.09—then add 25 cents for the first minute so it costs $2.34." A poor explanation might be just giving the solution, "11 times 19 plus 25," or even just providing the answer—"I got $2.34." If a helper says, "11 times 19," then the receiver should say, "Why is it 19?" or "Why do you multiply by 11?" Asking good questions and giving clear explanations are critical, and usually these skills must be explicitly taught or modeled.

Setting Up Cooperative Groups

How large should a cooperative group be? A meta-analysis of 71 studies showed that group size was unrelated to how much students learned during interactive activities with peers (Tenenbaum et al., 2020). However, the best choice probably depends on your learning goals. If the goal is for the group members to review, rehearse information, or practice, four to five or six students is about the right size. But if the goal is to encourage each student to participate in discussions, problem-solve, or collaborate at one computer, then groups of two to four members work best. Let's look at a few other factors you might want to consider when setting up cooperative groups.

GROUP COMPOSITION. In general, heterogeneous groups—those that are diverse in multiple ways—are best for supporting learning and social skills. Therefore, when setting up cooperative groups, it often makes sense to balance the group by what you know about your students (e.g., personality, ability, background, special skills). For instance, when quiet or shy students are outnumbered in a group, they tend to be left out of the discussions. By contrast, when there are only one or two assertive or outspoken students in the group, they tend to dominate. Establishing rules of engagement, such as "No person speaks twice until each person has spoken once," can help distribute the talk time.

If a group includes some students who are perceived as different or who are often rejected, then be sure that the group includes members who are patient and kind. One successful teacher interviewed by Gillies and Boyle (2011) put it this way:

> I also try to make sure that there are one or two people in the group who have the ability to be tolerant. At least the kid in question will know that, while the other group members may not be his best friends, they won't give him a hard time. I try to put the least reactive kids in the group with the child in question. This year I've had a couple of girls who have been very good with difficult kids. They don't put up with nonsense but they don't over-react and are prepared to demonstrate some good social skills. (p. 72)

Table 10.4 Possible Student Roles in Cooperative Learning Groups

Depending on the purpose of the group and the age of the participants, having these assigned roles might help students cooperate and learn. Of course, students may have to be taught how to enact each role effectively, and roles should be rotated equitably so that students can participate in different aspects of group learning.

ROLE	DESCRIPTION
Encourager	Encourages reluctant or shy students to participate
Supporter	Shows appreciation of others' contributions, and recognizes accomplishments
Gate Keeper	Equalizes participation, and makes sure no one dominates
Coach	Helps with the academic content, explains concepts
Question Commander	Makes sure all students' questions are asked and answered
Checker	Checks the group's understanding
Taskmaster	Keeps the group on task
Recorder	Writes down ideas, decisions, and plans
Reflector	Keeps group aware of progress (or lack of progress)
Quiet Captain	Monitors noise level
Materials Manager	Picks up and returns materials

Source: Adapted from *Cooperative learning* by S. Kagan. Published by Kagan Publishing. Copyright © 1994 by Kagan Publishing.

Grouping students by ability level must also be done with care. Fourth- and fifth-grade students who were grouped homogeneously by reading ability performed worse on a small-group reading comprehension activity than did those grouped heterogeneously (Murphy et al., 2017). On the other hand, in some circumstances, homogeneous grouping might be helpful (Steenbergen-Hu et al, 2016). Whatever the case, teachers should select grouping practices according to their goals and monitor groups to make sure everyone is contributing and learning.

ASSIGNING ROLES. Some teachers assign roles to students to encourage cooperation and full participation. Several roles are described in Table 10.4. If you use roles, be sure that they support learning. In all groups, and particularly those that focus on social skills, roles should support listening, encouragement, and respect for differences. In groups that focus on practice, review, or mastery of basic skills, roles should support persistence, encouragement, and participation. In groups that focus on higher-order problem solving or complex learning, roles should encourage thoughtful discussion, sharing of explanations and insights, probing, **brainstorming**, and creativity. Make sure that you communicate to students that the major purpose of the groups is to support their learning, not simply to perform their roles and follow the procedures. Roles are supports for learning, not ends in themselves (Woolfolk Hoy & Tschannen-Moran, 1999).

Often, cooperative learning strategies include group reports to the entire class. If you have been on the receiving end of these class reports, you know that they can be deadly dull. One strategy is to give non-presenters meaningful roles to guide their listening. For example, audience members could assume an *investigative listener* role in which they predict and theorize during listening, summarize results, and/or relate their predictions and theories to the results in a "report out." Research shows that using roles like these promotes class dialogue and conceptual understanding (Palincsar & Herrenkohl, 2002). In my classes (Ellen here), I ask audience members to be "supportive critics" (Brown & Palincsar, 2018, p. 414). I provide a sheet of paper or a Google doc on which students in the audience type questions and feedback for each presenter as they listen. This benefits both the listener and the presenter.

Although cooperative learning has been found to enhance learning in a variety of cultural contexts, students from different cultural backgrounds may approach group work with different values related to processes such as communication, leadership, and interpersonal trust (Inns & Slavin, 2018). Not everyone will have the same ideas about what it means to work cooperatively. Modeling and setting clear guidelines can help.

Figure 10.4 Question Stems to Encourage Dialogue in Reciprocal Questioning

After participating in a lesson or studying an assignment on their own, students use these stems to develop questions, create and compare answers, and collaborate to create the best response.

What is an everyday application of _____?
How would you define _____ in your own words?
What are the advantages and disadvantages of _____?
What do you already know about _____?
Explain why _____ applies to _____.
How does _____ influence _____?
What is the value of _____?
What are the reasons for _____?
What are some arguments for and against _____?
What is your first choice about _____? Your second choice? _____? Why?
What if _____ and why?
Compare _____ and _____ based only on _____.
How would _____ be different if _____?
Do you agree or disagree with this claim _____? What is your evidence?

Examples of Cooperative Learning Techniques

We have established that developing deep understanding of content when working in cooperative groups requires that all the group members *participate* in *high-quality discussions* that include interpretations, connections, explanations, and evidence supporting claims. We now turn to different cooperative learning structures that build in these strategies. In addition to these approaches, you might check out Spencer Kagan's many cooperative learning structures and activity workbooks designed to accomplish different kinds of academic and social goals.

Reciprocal questioning
Students work in pairs or triads to ask and answer questions about lesson material.

RECIPROCAL QUESTIONING. **Reciprocal questioning** requires no special materials or testing procedures and can be used with a wide range of ages. After a lesson or presentation by the teacher, students work in pairs or triads to ask and answer questions about the material (King, 1990, 1994, 2002). The teacher provides question stems (see Figure 10.4), and then students are taught how to develop specific questions about the lesson material using the stems. Students create questions and then take turns asking and answering. This process has proved more effective than traditional discussion groups because it seems to encourage deeper thinking about the material as well as forming connections between the lesson and previous knowledge or experience.

Jigsaw classroom
A learning process in which each student is part of a group and each group member is given part of the material to be learned by the whole group. Students become "expert" on their piece and then teach it to the others in their group.

JIGSAW. Elliot Aronson and his graduate students invented the **Jigsaw classroom** when Aronson was a professor of social psychology and I (Anita) was a student at the University of Texas at Austin. Some of my friends worked on his research team. Aronson (2000) developed the approach "as a matter of absolute necessity to help defuse a highly explosive situation" (p. 137). The Austin schools had just been desegregated by court order. White, Black, and Latino students were together in classrooms for the first time. Hostility and turmoil ensued, with fistfights in corridors and classrooms. Aronson's answer was the Jigsaw classroom.

In Jigsaw, each group member is given a "piece" of the material (let's call them pieces A, B, C, and D) to be learned by the whole group. Students become "experts" on their piece. Because students have to learn and be tested on every piece of the larger "ABCD puzzle,"

everyone's contribution is important—the students truly are interdependent. Another version, Jigsaw II, adds expert consultation groups. Imagine that your class has five groups, each with four group members who are responsible for teaching about their "piece" (A, B, C, or D). In Jigsaw II, new "expert" groups are formed based on the particular piece of the puzzle being learned. For example, each original group sends its "As" to one new expert group, its "Bs" to another expert group, and so on. These experts confer to make sure they understand their assigned part and to plan ways to teach the information to their original learning group. Students then return to their original learning groups with greater expertise. In the end, students take an individual test covering all the material and earn points for their learning team score (Aronson, 2000; Slavin, 1995). More recent evidence has shown that Jigsaw methods sometimes activate competitive and individualistic tendencies that impede the goals of collaborative learning (Roseth et al., 2019). Therefore, teachers should be sure to emphasize the interdependence goal that all members learn all of the material. Assigning group members to check the accuracy of fellow members' understanding can help monitor progress toward the group goal.

CONSTRUCTIVE/STRUCTURED CONTROVERSIES. Constructive conflict resolution is essential in classrooms because conflicts are inevitable and even necessary both for learning and for creating a peaceful and just society. In fact, David Johnson, whose ideas you've read about in this section, became interested in the topic of constructive conflict resolution after meeting students taking part in the lunch counter sit-ins in Greensboro, North Carolina, in protest of racial discrimination in 1961. His hope was "that racism would be ended most effectively through intervening in the socialization of the children, adolescents, and young adults" (Tjosvold et al., 2020, p. 351). Johnson helped teachers "stir up intellectual conflict" by selecting topics that have two well-documented positions (for and against) to engage students more deeply and maintain their interest (Johnson, 2015, p. 130). Piaget's theory similarly tells us that developing knowledge requires disequilibrium—cognitive conflict. In fact, research over the last 40 years demonstrates that **constructive/structured controversy**—engaging cooperative groups in a discussion around a topic that involves a structured intellectual conflict—can lead to greater learning, open-mindedness, seeing the perspectives of others, creativity, motivation, engagement, and self-esteem (Johnson & Johnson, 2009b; Roseth et al., 2011).

Let's look at an example provided by D. W. Johnson and R. Johnson (2009b): In U.S. history, students are learning about the role of civil disobedience in society. The ultimate goal is for students to reach consensus and write a critical essay articulating the pros and cons of the issue. The teacher begins by explaining to students that "in numerous instances, such as in the civil rights and antiwar movements in the United States, individuals have wrestled with the issue of breaking the law to redress a social injustice" (p. 40). The class might briefly identify such instances such as the Black Lives Matter protests or the U.S. Capitol riots on January 6, 2021. The teacher raises the guiding question "Is civil disobedience in a democracy constructive or destructive?" (p. 40).

One way to structure the lesson is by establishing four-person collaborative learning groups with two subgroup pairs. Each pair is tasked with developing and advocating for the best case possible for one side of the issue (e.g., the constructiveness or the destructiveness of civil disobedience in a democracy). After thorough research, each pair persuasively presents their side. Then the group engages in "spirited" open discussion, using as many facts as possible to support their position. Student pairs then *reverse* positions and present evidence from the opposing side. Finally, the group seeks consensus by creating a joint, integrated perspective on the issue. Along the way, the teacher can play devil's advocate or use questions to deepen critical thinking. Final reports and tests cover the full range of pros and cons about the topic. Teachers using this technique should establish both *academic* objectives and *social skills* objectives. Table 10.5 provides strategies for successful interpersonal engagement during discussion of controversies.

Connect and Extend to PRAXIS II®

Forms of Cooperative Learning (II, A2)

STAD and Jigsaw are just two of many cooperative learning techniques, each designed for certain instructional purposes. For cooperative learning activity ideas that are especially appropriate for older students, go to the Center for Teaching Excellence at Cornell University (http://teaching.cornell.edu) and search for "collaborative learning" or to the University of Tennessee at Chattanooga (http://www.utc.edu) and search for "cooperative learning."

Constructive/Structured controversy

Students work in cooperative groups to research a particular controversy.

Table 10.5 Strategies for Civil Discourse During Controversy or Conflict

STRATEGY	HOW?
1. I am critical of ideas, not people.	• I challenge and refute the ideas of the other participants while confirming their competence and value as individuals. • I do not indicate that I personally reject them.
2. Separate my personal worth from criticism of my ideas	• Recognize that even when people critique my ideas, I am still valued.
3. Remember that we are all in this together, sink or swim.	• Focus on reaching the best decision possible, not on winning. • Listen to everyone's ideas, even if I do not agree.
4. Encourage everyone to participate and to master all the relevant information.	• I want to support other people's understanding of the issue. • Restate what someone has said if it is not clear.
5. Differentiate before I try to integrate.	• First, I bring out all ideas and facts supporting both sides and clarify how the positions differ. • Then I try to identify points of agreement and put them together in a way that makes sense.
6. Try to understand both sides of the issue.	• I try to see the issue from the opposing perspective to understand. • I change my mind when the evidence clearly indicates that I should do so.
7. Emphasize rationality in seeking the best possible answer, given the available data.	• I help everyone remember that we might not have all the data on the issue, but we can reason with what we have.
8. Follow the golden rule of conflict: I act toward opponents as I would have them act toward me.	• I want the opposing pair to listen to me, so I listen to them. • I want the opposing pair to include my ideas in their thinking, so I include their ideas in my thinking. • I want the opposing pair to see the issue from my perspective, so I take their perspective.

Source: Based on Johnson, D. W., & Jonson, R. T. (2009b). Energizing learning: The instructional power of conflict. *Educational Researcher, 38*(1), pp. 42–43. https://doi.org/10.3102/0013189X08330540

Reaching Every Student: Using Cooperative Learning Wisely

Cooperative learning always benefits from careful planning, and meeting the needs of diverse learners requires extra attention and preparation. The *Guidelines: Using Cooperative Learning* give you ideas for using cooperative learning with all your students. For example, cooperative structures such as scripted questioning and peer tutoring depend on a balanced interaction between the person taking the role of questioner or explainer and the student who is answering or being taught. In these interactions, you want to see and hear explaining and teaching, not just telling or giving right answers. But many students with learning disabilities have difficulties understanding new concepts, so both the explainer and the student can get frustrated, and social rejection for the student with learning disabilities might follow. Because students with learning disabilities often have problems with social relations, it is not a good idea to put them in situations where more rejection is likely. So, when you are teaching new or difficult-to-grasp concepts, cooperative learning might not be the best choice for students with learning disabilities (Kirk et al., 2006; Smith, 2006).

GUIDELINES

Using Cooperative Learning

Fit group size and composition to your learning goals.

Examples

1. For social skills and team-building goals, use groups of two to five, common interest groups, mixed groups, or random groups.
2. For structured, fact- and skill-based, practice-and-review tasks, use groups of four to six, mixed-ability such as high-middle and middle-low or high-low and middle-middle group compositions.
3. For higher-level conceptual and thinking tasks, use groups of two to four; select members to encourage interaction.

Assign appropriate roles.

Examples

1. For social skills and team-building goals, assign roles to monitor participation and conflict; rotate leadership of the group.
2. For structured fact- and skill-based, practice-and-review tasks, assign roles to monitor engagement and ensure low-status students have resources to offer, as in Jigsaw.
3. For higher-level conceptual and thinking tasks, assign roles only to encourage interaction, divergent thinking, and extended, connected discourse, as in debate teams, or to assign a group facilitator. Don't let roles get in the way of learning.

Make sure you assume a supporting role as the teacher.

Examples

1. For social skills and team-building goals, be a model and encourager.
2. For structured fact- and skill-based, practice-and-review tasks, be a model, director, or coach.
3. For higher-level conceptual and thinking tasks, be a model and facilitator.

Move around the room, and monitor the groups.

Examples

1. For social skills and team-building goals, watch for listening, turn taking, encouraging, and managing conflict.
2. For structured fact- and skill-based, practice-and-review tasks, watch for questioning, giving multiple elaborated explanations, attention, and practice.
3. For higher-level conceptual and thinking tasks, watch for questioning, explaining, elaborating, probing, divergent thinking, providing rationales, synthesizing, and using and connecting knowledge sources.

Start small and simple until you and the students know how to use cooperative methods.

Examples

1. For social skills and team-building goals, try one or two skills, such as listening and paraphrasing.
2. For structured fact- and skill-based, practice-and-review tasks, try pairs of students quizzing each other.
3. For higher-level conceptual and thinking tasks, try reciprocal questioning using pairs and just a few question stems.

For more information on cooperative learning, see http://www.co-operation.org.

Source: Based on Implications of cognitive approaches to peer learning for teacher education, by A. Woolfolk Hoy and M. Tschannen-Moran, 1999. In A. O'Donnell and A. King (Eds.), *Cognitive perspectives on peer learning*. Lawrence Erlbaum.

Advanced students also may not benefit from cooperative learning when groups are mixed in ability. The pace often is too slow, the tasks too simple, and there is just too much repetition. In addition, students with exceptionally high ability often fall into the role of teacher or end up just doing the work quickly for the whole group. If you use

mixed-ability groups, the challenges are to use complex tasks that allow work at different levels and keep advanced students engaged without losing the rest of the group (Smith, 2006).

Cooperative learning may be an excellent choice for students who are English learners (ELs), however. The Jigsaw cooperative structure is especially helpful because all students in the group, including the students who are ELs, have information that the group needs, so they also must talk, explain, and interact. In fact, the Jigsaw approach was developed in response to the need to create high interdependence in diverse groups. In many classrooms today, four to six or more languages are represented. Teachers can't be expected to master every heritage language spoken by all of their students every year. In these classrooms, cooperative groups can help as students work together on academic tasks. Students who speak two languages can help translate and explain lessons to others in the group. Speaking in a smaller group may be less anxiety provoking for students who are learning another language, so the students who are ELs may get more language practice with feedback in these groups (Smith, 2006).

Module 32 Summary

Collaboration and Cooperation (pp. 438–450)

What are the differences between collaboration and cooperation? One view is that collaboration is a philosophy about how to relate to others—how to learn and work. Collaboration is a way of dealing with people that respects differences, shares authority, and builds on the knowledge that is distributed among other people. Cooperation, on the other hand, is a way of working together with others to attain a shared goal.

Describe five elements that define true cooperative learning. Promotive interaction means that group members encourage and facilitate each other's efforts. They usually interact face-to-face and close together, but they also could interact via digital media around the world. Group members experience positive interdependence; they need each other for support, explanations, and guidance. Even though they work together and help each other, members of the group must ultimately demonstrate learning on their own. They are held individually accountable for learning, often through individual tests or other assessments. If necessary, the collaborative skills important for effective group functioning, such as giving constructive feedback, reaching consensus, and involving every member, are taught and practiced before the groups tackle a learning task. Finally, members monitor group processes and relationships to make sure the group is working effectively and to learn about the dynamics of groups.

What are the learning theory underpinnings of cooperative learning, and what can go wrong? Learning can be enhanced in cooperative groups through rehearsal and elaboration (information processing theories), creation and resolution of disequilibrium (Piaget's theory), or scaffolding of higher mental processes (Vygotsky's theory). But if there is pressure in a group for conformity—perhaps because rewards are being misused or one student dominates the others—interactions can be unproductive and unreflective. Without feedback about accuracy, misconceptions might be reinforced, or the worst, not the best, ideas may be combined to construct a superficial or even incorrect understanding. Students who work in groups but arrive at wrong answers may be more confident that they are right. Also, the ideas of low-status students may be ignored or even ridiculed while the contributions of high-status students are accepted and reinforced, regardless of the merit of either set of ideas.

How should tasks match design in cooperative learning? Teachers have a role before, during, and after cooperative learning. First, they must select an appropriate task. A relatively structured task works well with a structured technique; extrinsic rewards can enhance motivation, effort, and persistence under these conditions; roles, especially those that focus attention on the work to be accomplished, also may be productive. On the other hand, strategies that encourage extended and productive interactions are appropriate when the goal is to develop higher-order thinking and problem solving. The use of rewards may well divert the group away from the goal of in-depth cognitive processing. When the goal of peer learning is enhanced social skills

or increased intergroup understanding and appreciation of diversity, the assignment of specific roles and functions within the group might support communication. Rewards probably are not necessary and may actually get in the way because the goal is to build community, a sense of respect, and responsibility for team members.

What are some possible strategies for cooperative learning? Strategies include reciprocal questioning, Jigsaw, and constructive/structured controversy, but there are many other cooperative structures. But cooperative learning is not for everyone. Sometimes students with learning disabilities and students with more advanced knowledge do not benefit from cooperative learning.

MODULE 33 Technology in Teaching and Learning

Learning Objective 10.5 Describe positive and negative influences of technology-mediated instruction on how children and adolescents develop and learn.

Designing Interactive Digital Learning Environments

It seems that computers, smartphones, iPads, tablets, digital readers, wikis, and interactive video games, along with Twitter, Google, WhatsApp, TikTok, Snapchat, Instagram, Facebook, Slack, and other digital tools and media, have changed life for everyone. Homes and schools are filled with digital media. Many of your students will have already had years of experience using digital tools to play and learn even from early ages. Their immersion in technology-enhanced games may make traditional school activities seem tame and boring by comparison (Common Sense Media, 2013; Connor-Zachocki et al., 2015; Graesser, 2013; Lenhart, 2015; Turkle, 2011). When COVID-19 hit, even the most routine social exchanges went digital, and the primary methods of teaching and learning did too.

Stop & Think How many digital interactions do you have in a typical day? What makes those interactions important and meaningful in your life? What opportunities have your digital interactions made possible? What, if anything, is lost through digital communication?

For many students, doing homework often involves exchanging messages with friends via text, watching online videos for help, searching the Internet for information, and downloading resources—all while streaming a favorite playlist. Your students are unlikely to have ever known a world without digital media, so they have been called *digital natives, homo zappiens, the Net generation, iGenerations*, or *Google Generation* (Kirschner & van Merriënboer, 2013). Students are at least as expert at using technology as their teachers, and most of this expertise was acquired outside school (Graesser, 2013). But teachers are increasingly integrating technology into their lesson plans, often using constructivist principles as a guide.

Technology and Learning

Does technology use support academic learning? The answer is complex because technologies are vast and ever-changing, as are the environments in which they are used and the skills of those using them. Research methods also differ across studies. Consider several findings from recent reviews:

- Computers are more likely to increase achievement if they support the basic processes that lead to deep learning: active engagement, frequent interaction with feedback, authenticity and real-world connection, scaffolding support, worked examples and problem-solving opportunities, and productive group work (Belland et al., 2017; Graesser, 2020a; Jackson et al., 2006; Tamim et al., 2011).

- Being in a one-to-one laptop program (students who have laptops assigned to them) is associated with higher achievement in math, English, science, and writing and more student-centered and project-based instruction (Zheng et al., 2016). Students also show greater enthusiasm for using devices like laptops, tablets, and mobile devices (e.g., Mulet et al., 2019).
- Basic reading processes, such as word decoding or phonological awareness, or basic number sense can be facilitated by specialized software that can provide individual feedback, advance at the right pace for each student, and increase motivation. Well-designed programs also can improve listening and reading comprehension (Baroody et al., 2013; Potocki et al., 2013; Savage et al., 2013).
- Computer-supported collaborative learning—collaborative learning that takes place with the help of technological tools such as video conferencing, discussion boards, games, and chats—can increase learning in science, technology, engineering, and math (Jeong et al., 2019). Scaffolding techniques such as scripts can increase the effects on learning and result in better collaboration skills (Vogel et al., 2017).

What can we conclude? We can have some faith in these findings but remember that every review has limitations and counterexamples in the literature. Ultimately, like any teaching tool, digital devices and supports can be effective if used well, but just having access to them will not automatically increase academic achievement.

Technology-Rich Environments

With all the technology available today, interest in technology-rich learning environments is growing. These environments include virtual worlds, computer simulations that support problem-based learning, intelligent tutoring systems, augmented reality activities, educational games, video creation, wearable devices, and artificial intelligence (like Siri and Alexa)—to name just a few.

Let's consider several ways in which technology can be useful in schools. First, teachers can design technology-based activities for their classrooms, for remote learning environments, or for blended models using both in-class and remote environments. Second, students can interact with technologies in a variety of ways, such as by using a computer or tablet to complete assignments or by collaborating in a virtual environment with other students or teachers using interactive applications. Cloud-based applications, such as Google documents, allow users to simultaneously access, edit, and store files, as long as they have an Internet connection. Finally, administrators use technology to track teacher, class, and student information in school, district, or statewide systems. You could be involved with any or all of these uses of technology in your teaching. A golden rule for technology integration in any classroom is that you do not need to reinvent the wheel. Focus on identifying centers of expertise where existing resources are available to adapt and build on.

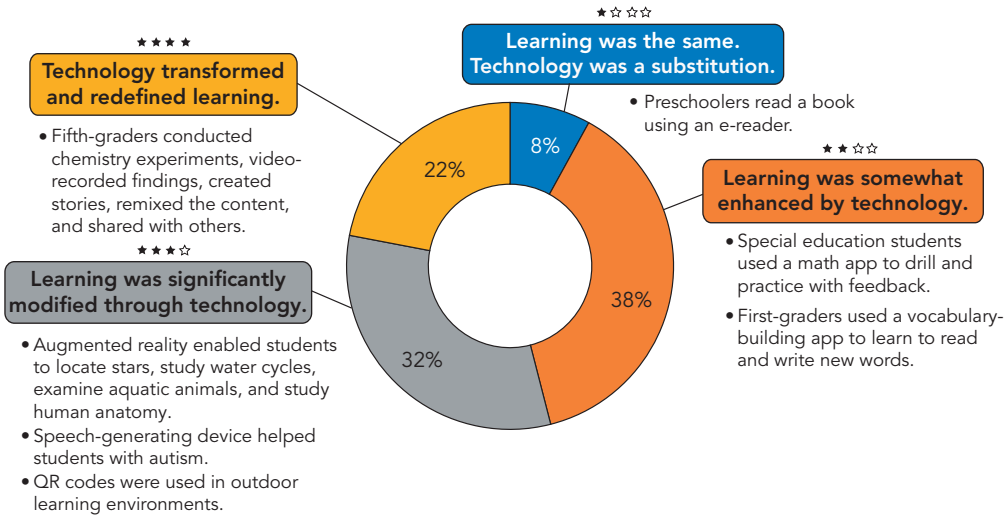
MOBILE LEARNING. The proliferation of phones, tablets, and other portable devices has led to new opportunities for (almost) anywhere, anytime learning. The learning "environment" has become more dynamic than ever. **Mobile learning** refers to "learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, 2013, p. 4). But one question teachers should care about is whether the use of mobile technology leads to deep, transformational learning. Helen Crompton and Diane Burke (2020) attempted to find out. They analyzed 186 studies published between 2014 and 2019 to understand the effects of mobile technologies on students' learning in grades PreK–12. They categorized the studies along a continuum from least to most transformational for learning. Figure 10.5 provides examples of classroom activities they reviewed from least to most transformational. More than half of the studies found that mobile technologies significantly promoted deep learning.

Mobile learning
Learning that takes place across contexts through the use of personal electronic devices.

Some education scholars have pointed to positive, and even transformational, ways that teachers could harness the power of personalized learning through mobile technologies. But others are tentative in their enthusiasm. Because our devices enable learning to

Figure 10.5 Do Mobile Technologies Enhance Learning?

Helen Crompton and Diane Burke (2020) classified 186 studies that involved mobile technology devices in PreK–12 settings based on the degree to which technology use enhanced learning. This figure shows the percentage of studies that were in each learning outcome category. Stars reflect a more transformational use of technology. Examples from the research reviewed are included.



Source: Based on Mobile learning and pedagogical opportunities: A configurative systematic review of PreK–12 research using the SAMR framework, by H. Crompton and D. Burke, 2020, *Computers and Education*. https://doi.org/10.1016/j.compedu.2020.103945. Graphic created by Ellen Usher.

occur in multiple *contexts* and learners to interact with other *people* and with *content* in novel ways, understanding best practices for how to use them will be complicated (Danish & Hmelo-Silver, 2020). Richard Mayer (2020) suggested that teachers make learning outcomes, not technology, their primary focus. Mayer noted that few rigorous scientific experiments have focused on the effects of mobile devices on learning. In addition, teachers and learners will need to know how to put their mobile tools to optimal use (Bernacki et al., 2020).

VIRTUAL LEARNING ENVIRONMENTS. **Virtual learning environments (VLEs)** are technology-based platforms that allow learning in a variety of ways. The most traditional VLE, and one you are likely familiar with, is a **learning management system (LMS)**. Most LMSs, such as Blackboard, Canvas, and D2L, are large, complex, and costly. Most sites have spaces for class readings, discussion groups, class-built wikis, slide presentations, a calendar, and many other resources. The LMS has expanded our teaching and learning options. During the initial months of the COVID-19 pandemic, most teachers had to learn how to build their own virtual classrooms—a new way of presenting content, scaffolding instruction, and interacting with learners.

Virtual learning environments (VLEs)
Technology-based platforms that allow learning in a variety of ways.

Learning management system (LMS)
Systems that deliver e-learning, provide tools and learning materials, keep records, administer assessments, and manage learning.

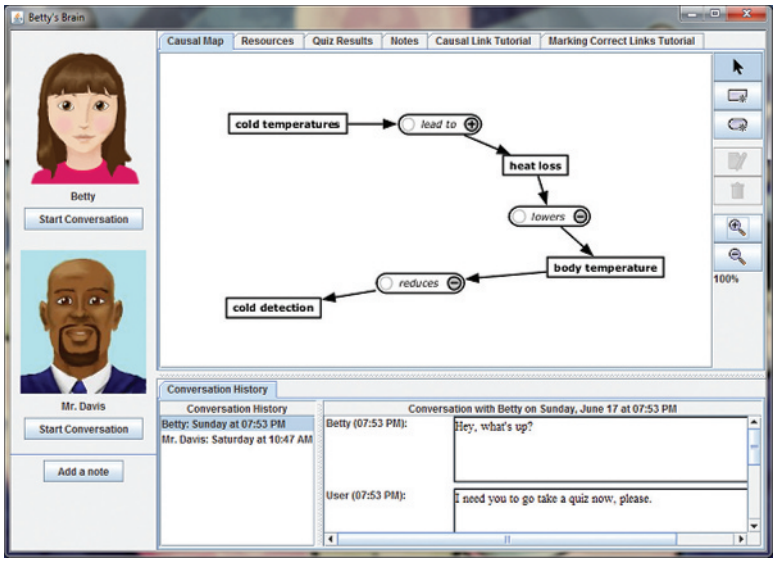
Teachers use a variety of virtual platforms to support instruction and learning. Betty's Brain is an example of a clever VLE developed by Vanderbilt and Stanford Universities (go to http://www.vanderbilt.edu and search for "Betty's Brain" for more information). In this virtual environment, students are challenged to learn a science topic so well that they can "teach" the topic to a computer agent known as Betty. The platform provides links to resources for the students to use when learning and planning their instruction. (Remember the research on cooperative learning shows that the *explainer* learns more than the listener; O'Donnell, 2006.) Like all good teachers, the students who are working with Betty must keep track of how well she is learning by asking Betty to answer questions and take quizzes. The platform also includes an expert on the topic, Mr. Davis, who grades Betty's work and mentors the student "teachers." See Figure 10.6 for an example screen from Betty's Brain.

Many virtual learning environments become **personal learning environments (PLE)** by providing tools that support individualized learning in a variety of contexts and

Personal learning environment (PLE)
Virtual platform that provides tools that support individualized learning in a variety of contexts and situations.

Figure 10.6 Betty's Brain: A Virtual Learning Environment

Betty's Brain is a computer-based learning environment that uses learning-by-teaching to engage students in learning about science topics.



Source: Based on http://www.teachableagents.org/research/bettysbrain.php.

situations. Learners assume control of how and when their learning occurs. Learning can be asynchronous—taking place anytime and anywhere. Students can download an assignment at a coffee shop, read the material on the bus, and then post an analysis on the discussion board at 4:00 a.m. from their room. Complex PLEs include tools that assess learners' knowledge and then adapt the next content to fit their unique needs. Tools that support personal learning include computer-based training modules, e-books, cognitive tutors, videos by experts, content-creation platforms, quizzes, and self-assessment tools. Many have been very successful. For example, the intelligent tutoring system Cognitive Tutors teaches mathematics in schools throughout the United States (Graesser, 2013). Math is one thing, but how about more ill-structured domains like writing? An intelligent tutor can help here, too. In one study with 10th-graders, Writing Pal improved essay writing, although the students found some aspects of the system annoying (Roscoe & McNamara, 2013).

Personal learning network (PLN)

Framework in which knowledge is constructed through online peer interactions.

We might think of our own online interactions with peers as our **personal learning network (PLN)**. Our PLNs can consist of both synchronous (real-time) and asynchronous interactions. In K–12 schools, PLNs can be used for instruction and also as a resource for professional development. Outside of school, PLNs might be based around our social networking tools such as Facebook, Twitter, Edutopia, and EdWeb. These tools allow learning to move outside the school, city, and even country as we learn with others with similar interests (and sometimes opposing views!) around the globe. You benefit from these networks too—many great teaching ideas and resources shared by other teachers are available for free through the Open Educational Resources (https://www.oercommons.org/).

Immersive virtual learning environment (IVLE)

A simulation of a real-world environment that immerses students in tasks like those required in a professional practicum.

IMMERSIVE VIRTUAL LEARNING ENVIRONMENTS. The most complex VLE is an **immersive virtual learning environment (IVLE)**. The IVLE is a simulation of a real-world environment. The purpose of an IVLE is to learn in an interactive environment that simulates a real space or scenario, for example, by being eco explorers in the rainforest or reporters covering a story about an outbreak of food poisoning in a local school (Bagley & Shaffer, 2009; Gee, 2008; Gibson et al., 2006; Shaffer et al., 2009). Some IVLEs are designed to mimic tasks required in a professional practicum. For example, high school students took part in a virtual internship called PurpleState in which they served as political media strategists. The internship helped students collaborate with others to understand multiple viewpoints around controversial

political issues affecting their local community and raised students' self-efficacy for civic engagement (Chen & Stoddard, 2020). Internship activities involved designing a media campaign proposal for special interest groups for or against a particular issue, thus blending real-world engagement in a virtual scenario. These and similar immersive environments often include cognitive tutors, either through live mentors or computer-programmed agents who provide prompts or feedback after analyzing the student's behaviors. A meta-analysis of diverse studies that included one type of IVLE—an augmented reality component (i.e., an enhancement of the visual field for learning using a heads-up visual display) has shown positive effects on students' learning (Garzón & Acevedo, 2019). Other evidence has shown that IVLEs may increase students' enjoyment and engagement but do not always result in learning gains (Makransky et al., 2019, 2020; Mayer, 2019).

GAMES. What about computer-based educational games? A quick glance at people's gaming behavior outside school shows how engaging well-designed games can be. One estimate is that American students ages 8 to 18 spend an average of 13 hours a week playing video games—some more and some less, but some up to 30 hours a week. Often they are playing with others who are not in the same room or even the same time zone. Over 50% of adults also play video games—you may be one of them (Arena, 2015; Lenhart, 2015).

Many researchers suggest that games provide a natural, engaging form of learning and that "combining games with educational objectives could not only trigger students' learning motivation, but also provide them with interactive learning opportunities" (Sung & Hwang, 2013, p. 44). When designed well, interactive games can be useful conduits for learning because they engage cognitive skills such as problem solving, build social skills such as cooperation and communication, and enhance motivation through goal setting, intermittent reinforcement, and interest (Adachi & Willoughby, 2017; and see Cluster 12). Games might include a knowledge base developed by experts, a challenge to students in the form of a quest or role-play, and a final product such as creating a database, report, design, or problem solution. Games typically involve failure and setback, too, so they encourage students to persist by learning new skills from others and practicing. Much of game learning happens vicariously as gamers study the performances of experts. As you can see, many of these features could help learners construct (and co-construct) new knowledge and skills.

For example, Minecraft is one of the most popular games that enables learners to build meaningful content. This flexible program enables players to create worlds of their own by arranging blocks or play inside prebuilt worlds (e.g., Ming Dynasty, Sustainability City, Financial Literacy World). Players can interact, and teachers can monitor their whereabouts in the game. Minecraft has been used in diverse ways to enhance curricular learning such as when students have built or examined Civil War sites (social studies), city plans (math), animal cells (science), and storyboards (literature) (Baek et al., 2020).

Massive multi-player online games (MMOs) are interactive gaming environments constructed in virtual worlds in which a large number of people—sometimes millions—play simultaneously. Many MMOs are role-playing games (RPGs) in which the learner assumes a character role of an avatar—a new persona that they create or customize. Many of these games have **affinity groups**—online communities that share knowledge, strategies, role-play scenarios, game modifications, or fan fiction stories and novels based on the games. These groups provide practice in problem solving, communication, reading, and writing. In fact, students who don't seem to be good readers in school can be very capable readers of even complex text when they are trying to improve their gaming skills—a goal that makes sense to them. The University of Wisconsin Casual Learning Lab is using the wildly popular World of Warcraft as part of an after-school learning program. See http://wowinschool.pbworks.com for some ideas (King, 2015).

Massive multi-player online games (MMOs)
Interactive gaming environments constructed in virtual worlds with many players who may assume character roles or avatars.

Affinity groups
Online communities for video-game users where they can share knowledge, strategies, role-play scenarios, game modifications, or fan fiction stories and novels based on the games they are playing.

But even with the promise of digital games, there is no guarantee that students will learn from all educational games or transfer their learning to situations outside the game (Jabbar & Felicia, 2015; Mayer, 2019; Ownston, 2012; Roschelle, 2013). The effectiveness of games on learning depends on how well games are designed for learning (de Freitas, 2018). Pieter Wouters and his colleagues in the Netherlands (2013) analyzed 38 studies of serious

educational computer games conducted from 1990 to 2012. They concluded that games were more effective than traditional instruction in terms of learning and retention, but not in terms of motivation. Students participating in games learned more when the games were supplemented with other forms of instruction, when there were multiple sessions, and when the students worked in groups. In addition, a synthesis of research with K–12 students concluded that games designed to enhance learning, particularly games that included scaffolding that adapted the game to students' individual needs and interests, were more effective than teaching approaches that did not include games (Clark et al., 2016).

As a teacher, you may not have access to well-designed games that match or support your curriculum. How can you capitalize on students' extensive gaming outside school? One suggestion is to think of games as ways of "tilling the soil," getting students ready for learning by developing prior knowledge (Arena, 2015). For example, teachers have developed semester-long projects based on the game series Civilization. Another suggestion is to "gamify" certain elements of learning—"adding game elements in order to change existing learning processes" (Sailer & Homner, 2020, p. 78). Gaming elements that add fictional aspects (world, characters) and that involve students in interactive collaboration appear to improve learning (Sailer & Homner, 2020).

Even though not all your students will play the same games, you still can develop lessons around the games they do play. For instance, a language arts teacher might assign a persuasive essay requiring gaming enthusiasts to convince the rest of the class to play their favorite game. This means that students write based on personal expertise with games. See Arena (2015) for more ideas.

Computational Thinking and Coding

Computational thinking
The thought processes involved in formulating problems so you can represent their solution steps and algorithms for computing.

Using technology for learning and for life has become so pervasive for all ages that some educators argue students should learn **computational thinking**, defined as "knowing how to use data, models, simulations, and algorithmic thinking to formulate and solve problems" (Malby et al., 2017, p. 160). Computational thinking requires thinking like a computer scientist. According to the national K–12 Computer Science Teachers Association (2017), computational thinking is a skill that students should begin to develop in elementary school (http://www.csteachers.org).

Computational thinking includes programming and coding, machine learning, and artificial intelligence (AI). Four decades ago, Seymore Papert (1980, 1991, 1993) introduced LOGO programming and turtle graphics for children. Since then, interest in teaching students to code has grown. Some educators have argued that programming teaches students to think logically in all areas, but others have said that programming just helps students learn to program. Even so, there is ongoing interest in and advocacy for the value of coding as a way to foster computational thinking. Courses in coding, machine learning, and AI are growing in popularity in K–12 schools around the globe (Rich et al., 2019; Tikva & Tambouris, 2021; and see the K–12 Computer Science Framework: https://k12cs.org). Students can examine the algorithms by which machines are able to "learn" from data inputs and make user recommendations—this is how Netflix, Hulu, and YouTube offer us a menu of shows we might like (check out the 2020 film *The Social Dilemma*). Understanding cybersecurity, ethics, and equity is increasingly critical. These would be excellent topics for inquiry-based collaborative learning.

Tools and games related to teaching younger children about computational thinking are also exploding. Simple programming tools available today include Scratch, Alice, GameMaker, Kodable Pro, Cargo-Bot, Kodu, Daisy the Dinosaur, and Greenfoot. There is even a version of Scratch (developed by MIT) called Scratch Jr. that will allow children from kindergarten through second grade to program (de Ruiter & Bers, 2021)! Many of these programming languages allow even very young students to build programs by snapping together images of blocks on the computer screen. The way the blocks snap together controls actions of different characters on the computer screen (Grover & Pea, 2013). Costumes, sounds, colors, and other effects can be added. Table 10.6 provides other resources for learning to code.

Table 10.6 Resources for Teaching Coding

ORGANIZATION	WEBSITE
Girls Who Code	https://girlswhocode.com
Code.org	https://code.org
mBlock	https://mblock.makeblock.com
Technology Education and Literacy in Schools	https://www.tealsk12.org
Made with Code from Google	https://www.madewithcode.com
Minecraft Education Edition	https://education.minecraft.net
Cognimates (AI platform for building games, robots, and AI models)	https://cognimates.me
Google AI Experiments	https://experiments.withgoogle.com/collection/ai
Coding in the Classroom, Edutopia	https://www.edutopia.org/topic/coding-classroom

Source: Based on Malby et al. (2017). *Transforming learning with new technologies* (3rd ed.). Pearson; Touretzky et al. (2019). Envisioning AI for K–12: What should every child know about AI? *33rd AAAI Conference on Artificial Intelligence, AAAI 2019*, 9795–9799. https://doi.org/10.1609/aaai.v33i01.33019795

Media Use, Digital Citizenship, and Media Literacy

With the acceleration of digital media comes a new concern with literacy—digital and media literacy. Today, to be literate—to be able to read, write, and communicate—children have to read and write in many media, not just printed words. Information abounds from news, films, videos, websites, social media, photographs, artwork, magazines, music, TV, billboards, and more. How do children read these messages? What media are appropriate for children? What is your responsibility as a teacher to promote responsible digital use and literacy?

DEVELOPMENTALLY APPROPRIATE ACTIVITIES. Digital media are appealing, but are they appropriate for younger learners, such as preschool children? And how much screen time is appropriate for children and adolescents? These are hotly debated issues.

In making decisions about using any technological program or tool with your students, ask these four questions (Bullard, 2017): (1) Is it the best tool for the job? (2) Will it produce added value to the activity? (3) Is the activity itself beneficial to the child? (4) Are the benefits worth the costs? Using these questions will help you identify developmentally appropriate ways to use technology with young children.

As a general rule, computers should not be used to do solitary drill-and-practice activities. Software for young children should include simple spoken directions; the activities should be open-ended and encourage discovery, exploration, problem solving, understanding of cause and effect, and social interaction. Children should be able to remain in control of the activities through a variety of responses. Figure 10.7 provides a related checklist to help you evaluate whether certain software is appropriate for young children.

There is another important consideration: Do the program's multimedia features (e.g., embedded videos, music, added sounds, images) add to learning or take away from it? One danger is that programs will include attractive visuals or sound effects that actually interrupt and interfere with the development of important concepts. For example, do the sounds of a buzz saw and the thud of a falling tree in a Peter Rabbit storytelling program foster distractibility and interfere with understanding the story, plot, and characters? Maybe (Tsantis et al., 2003). Multimedia elements should focus on meaning and not just provide attractive "bells and whistles" that can add to extraneous cognitive load.

One final consideration has to do with the amount of technology use. Screen time has increased among all age groups over the past decade. What might be the costs? Jean Twenge and her colleagues (2018) investigated the psychological well-being of over a million 8th-, 10th-, and 12th-graders from 1996 to 2016. They noticed a sharp decline in students' well-being in 2012 in conjunction with similarly sharp increases in screen time (social media, Internet, texting) and decreases in activities not involving digital devices (e.g., sports/exercise, hanging out socially). Adolescents who were the happiest were

Figure 10.7 Checklist for Selecting Appropriate Software for Young Children

When screening software, consider the following criteria:

- ❑ Does the software have high educational or informational value? Is value added by using the software? Or would this information be better presented in a different format?
- ❑ Is the software developmentally appropriate for the children using it? According to Haugland (2005), only 20% of software is appropriate for children. Beware of software that is just an electronic work sheet page. The age limit, educational objectives, and educational philosophy should be clearly stated (Peterson, Verenikina, & Herrington, 2008).
- ❑ Is the software designed so that the child can use it independently (simple and clear directions, uses speech when appropriate, uses picture menus, and organized for intuitive use) (Prairie, 2005)?
- ❑ If providing simulations, they are realistic and real-world (Peterson, Verenikina, & Herrington, 2008).
- ❑ Is the child able to exercise control when using the software (sets the pace, can repeat a process, can stop and resume, chooses from multiple paths, and frequently saves)?
- ❑ Does the software encourage active learning (requires active participation and encourages exploration and further investigation, allows for trial and error)?
- ❑ Is the software exciting and interesting (utilizes many senses including sound, music, and voice; includes graphics and sounds that are motivating for young children; and is relevant to the group of children using the software)?
- ❑ Does the software scaffold children's learning (provides increasing challenges and a variety of levels, provides nonthreatening feedback allowing children to know their progress, provides hints and instruction, and does not penalize for mistakes)?
- ❑ Is the software anti-bias, containing respectful images of diverse cultures, multiple languages, people of different ages, abilities, colors, and diverse family structures (NAEYC, 1996)?
- ❑ Does the software promote prosocial values (no violence or implicit violence is present such as "blowing it up" to get rid of mistakes) (Tsantis, Bewick, & Thouvenelle, 2003)?
- ❑ Is the software preselected to match curricular goals, and is the software tied closely to other curricular activities? Software should support or be supported by the curriculum.
- ❑ Does the software have high-quality graphics and sounds? Graphics and sound need to add to the quality rather than being distracting.
- ❑ Is the software accessible for children with special needs?
- ❑ Does the software provide delight, enchantment, and adventure such as opportunities for free exploration, finding hidden secrets, and elements of surprise (Plowman, McPake, & Stephen, 2012)?

Source: Bullard, J. (2017). *Creating environments for learning: Birth to age eight* (3rd ed.). Pearson, p. 348. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc.

those who spent the least amount of time on their electronic devices. Other researchers have found that one to two hours of digital engagement per day is not harmful to the psychosocial functioning of children aged 6 months to 17 years old (Orben & Przybylski, 2019; Przybylski et al., 2020). However, excessive use (more than 5 hours per day) leads to problems, and social media use has a small but negative effect on well-being (Orben, 2020). As schools and societies become more screen based, setting limits for ourselves and learners is important. As the saying goes, variety is the spice of life. Teachers should keep this in mind by varying the opportunities students have to engage in activities on and off screen both in school and out.

DIGITAL CITIZENSHIP. Interacting with so much media means that students will need to learn how to be good stewards of information, safe and ethical users of digital media, and critical consumers. This will include teaching students about privacy related to securing/

sharing of personal information and others' information, intellectual property rights and proper attribution of content, protection from bad actors (e.g., malware, phishing), and professionalism. Learners also need to know how to evaluate the veracity of what they find online. Project Zero at Harvard has developed a K–12 Digital Citizenship curriculum with these and many other ideas for supporting students' digital well-being (James et al., 2019; and see https://www.commonsense.org/education).

CRITICAL MEDIA LITERACY. Being "media literate" includes the ability to critically assess print and online materials. Project Look Sharp at Ithaca College is directed by Cynthia Scheibe, a developmental psychologist whose mission is to provide K–16 educators with materials, training, and support to integrate media literacy and critical thinking about media into their lessons. For example, during the 2016 U.S. presidential election, Project Look Sharp provided 10 different lesson plans that helped students critically evaluate the candidates' campaign ads, videos, websites, articles, and news releases on topics such as racial justice, national security, voting rights, economic inequality, climate change, and immigration. Students used critical questions to guide them (e.g., Who made and sponsored this message? Who is the target audience? How accurate and credible is the information provided? What is left out?). Similar instructional materials were designed to help students evaluate media coverage related to the COVID-19 vaccine.

Helping your students ask critical questions about media seems more important than ever. *The Guidelines: Supporting the Development of Media Literacy*, based on work by Scheibe and Rogow (2008), give specific ideas for supporting the development of media literacy in your students.

GUIDELINES

Supporting the Development of Media Literacy

Use media to practice general observation, critical thinking, analysis, perspective taking, and communication skills.

Examples

1. Ask students to think critically about the information presented in advertising, "news" programs, and textbooks. Would different people interpret the messages in differing ways?
2. Foster creativity and communication by having students produce their own media on a topic you are studying.
3. Ask students to compare ways that information might be presented in a documentary, TV news report, advertisement, public service announcement, and so on.
4. Give examples of how word selection, background music, camera angles, color, and so on, can be used to set a mood or bias a message.

Use media to stimulate interest in a new topic.

Examples

1. Have students work in small groups to read, analyze, and discuss a controversial magazine, newspaper, or online article about a topic.
2. Ask students to do a media search for information about a topic.
3. Use a short video, magazine illustration, blog entry, or brief article to stimulate discussion, encouraging students to express what they already know or their opinion about a topic.

Help students identify what they already know or believe about a topic based on popular media content. Help them identify erroneous beliefs.

Examples

1. What do students "know" about space travel?
2. What have they learned about biology from advertisements?

(Continued)

Use media as a standard pedagogical tool.

Examples

1. Encourage students to follow (and write about) current events, including tracking a single story across diverse media sources.
2. Assign homework that makes use of different media.
3. Have students express opinions or attempt to persuade using different media, including photographs, collages, videos, poems, songs, animated films.

Analyze the effects that media had on historical events.

Examples

1. How were Native Americans portrayed in art and in films?
2. What sources of information were available 50 years ago? 100 years ago?

Use video effectively.

Examples

1. Show short segments, not whole films or programs.
2. Leave the lights on to encourage active viewing and discussion.
3. Before viewing, let students know what they should be looking/listening for.
4. Pause periodically during viewing to point out important information or ask questions.

For more ideas, see the Project Look Sharp website.

Blending and Flipping: Technology-Powered Pedagogy

We will all probably look back on the COVID-19 pandemic as a turning point in how teachers delivered instruction. Nearly all classrooms were initially converted to remote delivery models, and many moved to blended learning formats in which learners engaged in both in-person and online formats for a portion of the time. But even before the pandemic, many teachers adopted pedagogical approaches that leveraged the power of technology to allow for more interaction and activity (Graham et al., 2017).

One example of this is a flipped classroom design (Bergmann & Sams, 2012). Salman Khan's 2011 TED talk "Let's Use Video to Reinvent Education" called for teachers to "flip" the traditional model of instruction by using video to deliver lecture material and using class time for more interactive work (see https://khanacademy.org). In a flipped classroom, what has traditionally happened *in* classrooms—lessons, lectures, note taking, worksheets, direct teaching—is moved outside class to be completed independently online. Then what usually happens at *home*—homework, projects, practice—happens in class under the teacher's supervision and support. It appears that teachers see the value in this flipped approach. In 2014, 78% of teachers in a national survey reported that they had flipped at least one lesson, and 45% said they flipped once or twice a week (Maloy et al., 2021). What does a flipped classroom look like? Figure 10.8 gives some basics.

The flipped classroom and related approaches that blend online and in-person learning elements set up the conditions for learners to actively construct meaning. Teachers are no longer just providers of information. Students can learn core content at their own pace outside class. During class time, students interact with material and with each other. The teacher is a facilitator and scaffolder of learning. Groups and individuals can work on activities at their level, allowing teachers to differentiate instruction to students' needs. For students who do not have access to powerful learning technologies at home, some class time should be devoted to online researching, learning apps or games, creating digital portfolios, and listening to or creating podcasts.

Does flipping work? A description of findings from studies conducted between 2012 and 2018 revealed both strengths and weaknesses (Birgili et al., 2021). Students in flipped classrooms typically learned more, but most studies have been conducted in college classrooms (Shi et al., 2020). Another strength is that flipping instruction allows students to learn more at their own pace and to be more active during in-class learning. For example,

Figure 10.8 Traditional and Flipped Classrooms

	Traditional Classroom	Flipped Classroom
What happens during class	Teacher-led instruction with whole groups, small groups, and individuals	Student-led activities with whole groups, small groups, and individuals
	Students as learners	Students as teachers and learners
	Teacher comes ready to teach by imparting information or directing activities	Students come prepared to learn by doing activities and adding to online information
What happens outside of class	Students do homework using paper worksheets and writing prompts	Students watch videos or pencasts or listen to podcasts of teacher presentations
	Reading assignments come from paper textbooks	Reading assignments come from online textbooks or interactive web resources

Source: Maloy, R. W., Verock, R.-E., Edwards, S. A., & Trust, T. (2021). *Transforming learning with new technologies* (4th ed.). Pearson.

a fifth-grade math teacher observed more student-to-student talk after instruction was flipped (de Araujo et al., 2017). One challenge to this approach, however, has been getting students to be self-disciplined enough to engage deeply with the direct instructional materials when unsupervised or at home (Birgili et al., 2021). Some fear that students' and teachers' workloads are actually increasing by flipping instruction and that instructional quality is diminished.

Dilemmas of Constructivist Practice

Years ago, Larry Cremin (1961) observed that progressive, innovative pedagogies require infinitely skilled teachers. Today, the same could be said about constructivist teaching, and particularly the kind of teaching that involves technology-mediated learning (Pulham & Graham, 2018). We have already seen that many varieties of constructivism and many practices flow from these different conceptions. We also know that teaching today often happens in a context of high-stakes testing and accountability. In these situations, teachers who use constructivist approaches face conceptual, pedagogical, technological, cultural, and political dilemmas as they implement constructivist practices. Likewise, meaningful learning requires scaffolding instruction in ways that support learners' cognitive, behavioral, and affective engagement as individuals and as members of sociocultural groups (Borup et al., 2020). This naturally leads to some dilemmas and questions, some of which were outlined by Mark Windschitl (2002, p. 133):

- How can I honor students' attempts to think for themselves while remaining faithful to accepted disciplinary ideas?
- How can I manage new kinds of discourse and collaborative work in the classroom?
- How can I accommodate the worldviews of students from diverse backgrounds while at the same time transforming my own classroom culture?
- How do my own past images of what is proper and possible in a classroom prevent me from seeing the potential for a different kind of learning environment?
- Can I trust students to accept responsibility for their own learning?
- How can I allow for student-driven, problem-based learning and meet specific state and local standards?
- How can I gain the support of administrators and parents for teaching in such a radically different and unfamiliar way?

We do not know all the answers to these questions, but with evolving technologies and times, sociocultural constructivist practices that support meaningful learning certainly hold promise.

Module 33 Summary

Designing Interactive Digital Learning Environments (pp. 451–461)

What are some possible uses of technology in education? Technologies such as computers, mobile devices (iPads, tablets, smartphones), and interactive gaming systems are extremely popular among young people. In education, virtual learning environment (VLE) is a broad term that describes many ways of learning in virtual systems. There are different kinds of VLEs. The most traditional VLE is referred to as a learning management system (LMS). A personal learning environment (PLE) framework provides tools that support individualized learning in a variety of contexts and situations; the learners assume control of how and when their learning occurs, such as through online peer interactions. The most complex VLE is an immersive virtual learning environment (IVLE). The IVLE is a simulation of a real-world environment where students work alone or with others to solve problems, create projects, simulate the skills of experts, visit historical sites, tour world-class museums, or play games that teach and apply academic skills.

Does technology enhance learning? Technology by itself will not guarantee improvement in academic achievement; like any tool, technology must be used well by confident, competent teachers. Additional evidence from rigorous scientific studies is needed in K–12 settings. Some educators are suggesting that all students should learn computational thinking—thinking like a computer scientist—to formulate and solve problems that can be solved using the computational processes like those applied by computers. Many systems allow even very young students to create computer programs. Also, every student should learn to be a good digital citizen, which includes the ability to critically evaluate the digital media they consume.

What are blended instruction and a flipped classroom? Blended instruction refers to a combination of online and in-person learning. One type of blended instruction is the flipped classroom. In a flipped classroom, what usually happens in class—lessons, lectures, note taking, worksheets, direct teaching—is moved outside class, and what usually happens at home—homework, projects, practice—happens in class under the teacher's supervision and support. For students who do not have access to powerful learning technologies at home, some class time can be devoted to online research, learning games, wikis, blogs, creating digital portfolios, listening to or creating podcasts, or using learning apps.

What are some dilemmas of constructivist practice? Teachers must learn how to design, facilitate, and scaffold instruction in ways that support learners' cognitive, behavioral, and affective engagement—often while also integrating technologies to help. This can raise common dilemmas around the degree of control, classroom management, challenging prior assumptions about "best" practices, and reconciling the tension between student-supported learning and standards-driven instruction.

Cluster 10 Review

Key Terms

Advance organizer
Affinity groups
Appropriating
Brainstorming
Cognitive apprenticeship
Collaboration
Community of practice
Complex learning environments
Computational thinking
Constructive/Structured controversy
Constructivism/Constructivist approach
Cooperation
Cooperative learning
Co-regulated learning
Immersive virtual learning environment (IVLE)
Inquiry learning
Jigsaw classroom
Learning management system (LMS)
Learning sciences
Massive multi-player online games (MMOs)
Mobile learning
Multiple representations of content
Personal learning environment (PLE)
Personal learning network (PLN)
Problem-based learning
Radical constructivism
Reciprocal questioning
Scaffolding
Situated learning
Social negotiation
Spiral curriculum
Virtual learning environments (VLEs)
Zone of proximal development

Connect and Extend to Licensure

Multiple-Choice Questions

1. Which one of the following activities would NOT be consistent with a constructivist environment?
   - **A.** Students are given frequent opportunities to engage in complex, meaningful, problem-based activities.
   - **B.** Students work collaboratively and are given support to engage in task-oriented dialogue with one another.
   - **C.** Teachers elicit students' ideas and experiences in relationship to key topics, then fashion learning situations that assist students in elaborating on or restructuring their current knowledge.
   - **D.** Teachers employ limited assessment strategies and give feedback on products rather than processes.
2. In Mr. Lawrence's classroom, students are engaged in learning the art of driving. They watch Mr. Lawrence model techniques, receive hints and feedback from him on their performance, and are encouraged to put into words the new skills they are practicing. This type of learning is best referred to as which one of the following?
   - **A.** Reciprocal teaching
   - **B.** Cognitive apprenticeship
   - **C.** Cooperative learning
   - **D.** Schema building
3. Group activities must be well planned. Students need to be prepared to work in groups, and teachers have to be explicit in stating their expectations. Which one of the following strategies is NOT an element that defines true cooperative learning?
   - **A.** Positive interdependence and individual accountability
   - **B.** Group processing
   - **C.** Competition
   - **D.** Collaborative and social skills
4. Research demonstrates that constructive controversy can lead to greater learning, open-mindedness, seeing the perspectives of others, creativity, motivation, and engagement. Which one of the following is a setup for activities that engage students in constructive/structured controversies?
   - **A.** Students work in pairs within their four-person cooperative groups to research a particular argument.
   - **B.** Each student is part of a group, and each group member is given part of the material to be learned by the whole group. Students become experts on their piece and then teach it to the others in their group.
   - **C.** Students intuitively understand the design that helps them think deeply about what they read.
   - **D.** A combination of academic learning with personal and social development for secondary and college students is created.

Constructed-Response Questions

Case

To infuse her class with constructivist strategies, Brenda Rhodes planned several problem-based learning scenarios. One of the scenarios required students to find a solution for their city's homeless population. Over the past few years, the number of homeless individuals and families had grown alarmingly quickly. Social service agencies, shelters, and businesses in the central city were struggling to deal with the challenge. Brenda believed her students would find the topic interesting and that it met the criteria for problem-based learning.

5. Does Brenda Rhodes's activity of finding a solution for the city's homeless population as a topic meet the requirements for problem-based learning? Explain your answer.
6. Identify several types of scaffolding the students might use to help them solve their problem.

What Would They Do?

Teachers' Casebook: Necessity Is the Mother of Inventive Teaching

At the beginning of this cluster, we asked you to think critically about how you would plan interactive, collaborative assignments for your students during remote or hybrid instruction. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching? Take a look at how some practicing teachers responded to the situation described at the beginning of the cluster.

Chris Dillon • K–12th-Grade Music Teacher
Model Laboratory School at Eastern Kentucky University, Richmond, KY

The phrase "technology-enhanced instruction" is a misnomer—instruction is already technologically enhanced in today's traditional classroom. Whether instruction is virtual, face-to-face, or a hybrid combination, the most critical feature of any pedagogically sound learning environment is the establishment

of the student-teacher relationship. This relationship can be facilitated virtually in many different ways; however, I try to remember that the student on the other end of the screen is a human first, a student second. Establishing my role of "teacher" is important but establishing myself as a person who wants to build community and value my students as individuals is the first step to ensuring students feel as if they belong, regardless of the environment in which they're learning. As we see classes and instruction move to hybrid or virtual learning spaces, we must adjust our assessments and assignments to fit our students' needs. Because we are able to search for the answer to any question using the internet, assessments and assignments should be created in a way that makes students build on their skills, not regurgitate information. For example, I asked both my virtual and face-to-face students to use technology to create their own original electronic music compositions rather than having them define musical terminology or analyze a piece of music they're not into. I provided them with examples of each step in the process, facilitated students creating original compositions in small groups, then had them create their own work using the skills they built over the course of the class. Regardless of subject area or method of delivery (virtual, hybrid, or face-to-face), classes should be conducted in a manner that allows for student choice, individualized attention (small group or one-on-one), meaningful and timely feedback, and opportunities for collaboration.

Donnie Piercey • 5th-Grade Teacher & 2021 Kentucky Teacher of the Year
Stonewall Elementary School, Lexington, KY

Because COVID has forced schools to address the issues that many of us had been screaming about for ages pre-pandemic (especially surrounding equity and access), the role of technology in the classroom has changed. As I reflect on what hybrid strategies or assignments I'll carry on post-pandemic, the ones which place an emphasis on student creativity come to mind. Creativity isn't something that can be contained within classroom walls, nor should it be restrained in any type of hybrid model of instruction. Keeping students engaged, especially when learning remotely, is not easy. Making sure students are on the correct webpage or using the proper resource is a new kind of classroom management strategy that we're all trying to figure out how to accomplish every day. However, when my students are using technology to solve problems that they have a genuine interest in, those issues rarely come up. On larger projects, I encourage my students to self-choose problems that they want to solve. When students know they have autonomous ownership over their problem solving—especially when they're working collaboratively with their classmates—the engagement is always high. I've learned that this holds true whether we're in person or on the other side of a video call.

Coralie Hafner • 1st-Grade Teacher
Olde Orchard Alternative Elementary, Columbus, OH

Effective technology-enhanced instruction begins with having consistent and clear communication with students and families. This can be offered by providing a home base for families to refer back to that houses all of the necessary information and resources, which would decrease their feeling overwhelmed and confused. Offer whole group and small group sessions that are tailored to specific needs. Have clear expectations for students while they're online (independent work and small groups) creating daily schedules to limit time off task. Be intentional with how and what's communicated, ensuring that each interaction and assignment is necessary and enhances learning. Through Google Classroom I would provide access to all assignments and activities that students are expected to complete. Google forms would be used for exit slips, assessments, and feedback. I would use Google Slides to create an interactive virtual classroom where students would navigate through a set of slides that have been linked to specific websites and learning tasks. Chrome Canvas is a virtual white board that can be linked to the Google Class Folder. I would have my students complete home-based projects, virtual showcases (Read alouds, Writer's Workshop) through the use of Flipgrid. To enhance student independence and engagement, students would use and submit a Google Form check-off list. Assignments would not only be provided through the interactive classroom as they would include the engagement of family members, virtual field trips, combining classrooms with other teachers, and the recording of personal interviews and experiences. Collaboration would be offered through small group sessions, peer sharing through virtual art and writing fairs, breakout groups, and responding to student videos. Creating clear communication norms while interacting online and providing intentional time for celebration and recognition throughout the sessions will increase cooperation and collective advocacy as well as enhance the learning environment and experience for all learners.

Lori Hall • 9th-Grade Math Teacher
Monroe High School, Monroe, NC

Teaching two sets of students, those physically in the room and those joining remotely, would definitely require a new set of strategies. Because this may be a reality for the upcoming school year, it has been on my mind all summer. No matter what, I am responsible for getting the content to my classes as equitably as possible. I am an advocate for cooperative learning and if you ever walked into my classroom, you would see students working together at tables and having mathematical discussions as well as problem solving. In a remote situation, I would continue assigning cooperative tasks to my students and pair those in person with those who are remote to create an opportunity for mathematical discourse between the two groups. This would provide insight into their perceptions and misconceptions. In order for this to work, the expectations for the assignment would need to be clear. This is not group work, where some students do all the work and everyone gets a grade. There will have to be different tasks assigned to different students; they would need to either record their conversations or invite me to join so that I could ensure that everyone is engaged in the conversation. Cooperative learning would allow accountability for each student and also provide

the socialization that those remote students would be missing. Education continues to evolve and I must keep a growth mindset to keep up with the changes and meet the needs of my students.

Melissa Cho • 3rd- and 4th-Grade Teacher
Royal Heights Elementary School, Surrey, British Columbia, Canada

Overnight, the pandemic immensely shifted the way I planned and taught as an educator. Changing to an online platform forced me to be resourceful and find meaningful ways to connect, reach, and engage my learners with their school community through remote learning. There were bountiful amounts of resources available to me, but the difficulty was finding the right digital platforms that were efficient, effective and easy to navigate for myself, my learners and their families. Moving forward, when planning future curriculum and activities, it is important to consider the current teaching conditions when implementing activities so that learners are able to adapt to a routine with or without my physical presence. Utilizing technology within the classroom is important to keep current in the case that remote learning becomes a reality again. It is important to keep learning activities clear, simple, interactive and short. Using digital platforms for reading such as RAZ Kids and EPIC Books allowed students to have access to materials while at home, but using apps such as LOOM to record read alouds and other lessons also ensured that learners who did not have access to appropriate technology such as Wifi were able to participate and engage through offline applications. Hosting whole group and small group meetings during remote learning played a large part in maintaining student engagement during online learning. Classroom meetings helped learners remain connected to their peers and adults in their classroom community, even from afar. It is important to choose a platform that offered screen sharing, video, and audio as it aided in the facilitation of small and whole group meetings. When facilitating a whole class meeting, it is important to always begin with sharing. We always started the day with a sharing circle which helped keep learners curious and engaged with one another. I also found that hosting mini lesson groups online helped learners connect closely and collaborate with a variety of peers. Incorporating simple activities during remote learning and having learners bring them to small group meetings to share or build together was helpful in order to create collaboration. Having learners being responsible for bringing one small piece of an activity to a guided meeting helped keep them accountable during remote learning.

Kathryn Larsen • Assistant Principal, Grades 7–9
Pleasant Grove Junior High School, Pleasant Grove, UT

Technology should be leveraged to increase student achievement. Simply using technology, such as a laptop, a Chromebook an iPad, or an LMS (learning management system) will not result in enhanced learning. Instead, technology should provide an opportunity for students to engage in critical thinking and collaboration in ways that they could not do without the technology. For example, a book club that typically engaged students in a discussion with other students in the physical classroom could be expanded to a discussion on an LMS platform to include students in multiple classrooms or even students in multiple schools. This broadens student perspectives, while still requiring critical thinking, collaboration, and different forms of communication on the part of the students. Collaborative groups can be set up in many remote learning platforms. These collaborative groups can be teacher assigned or the students' choice. Setting up collaborative groups will allow students to use district-provided technology and even their own phones if available to work with their peers. Many LMS platforms provide features such as discussion boards, the ability to assign groups of students to different assignment modules, and unique ways to post work. Face-to-face and even online time at the beginning of the school year should be used to teach collaboration skills, as teachers cannot assume that students already know how to collaborate. During school dismissal and online learning, my students continued their work in book clubs. This is a format we worked through numerous times in class, so I set it up online in as similar a way as possible. Students chose the books they would like to read, I assigned different online modules to each book group, and they collaborated together to reach the goals that they set for themselves as they read and discussed the book.

It is very difficult to engage students in an online platform when the teacher has not taken the time to build relationships with students. Instead of focusing on all the learning that may have been lost at the end of the last school year, work to build relationships with new students so that they feel unity and belonging in the classroom, whether that is a face-to-face classroom, a hybrid, or an online setting. When engaging in a hybrid or fully online setting, choose five or six assignment structures and explicitly teach students how to complete those assignments. If you have face-to-face time at the start of the year, use it wisely to go over what your class will look like during online instruction, so students feel prepared for that inevitability. Whether you start the year in person, in a hybrid model, or online, take the time to set both in-person and online class norms. Ensure that your students are aware of what the expectations are for the class in whatever format it may be offered. Remember that students do not automatically know expectations. These must be taught.

Feedback and self-reflection are key to independence and engagement when learning remotely. Remote learning leads to feelings of isolation, and student engagement is likely to suffer when fostering a culture of belonging and autonomy becomes more difficult because of remote learning. In an online setting, it is imperative that teachers acknowledge the good work that students are doing independently and that they offer personal feedback daily. Teachers should keep as many of the feedback structures as possible the same in online learning as during face-to-face instruction. This is demanding and time consuming for the teacher, but students cannot engage and thrive when they are not receiving timely, specific, and kind feedback.

Cluster 11

Social Cognitive Views of Learning and Motivation



Tobithe M. J. W., Age 10, Cameroon ICAF.org

Teachers' Casebook:

Failure to Self-Regulate

What Would You Do?

You know that your students need to be organized and self-regulating to do well in both their current and their future classes. But many of the students just don't seem to know how to take charge of their own learning. They have trouble completing larger projects—many wait until the last minute. They can't organize their work or decide what is most important. Some aren't keeping up with assignments. Their book bags are disaster areas—filled with long-overdue assignment sheets and class handouts from last semester crumbled in with permission slips for field trips. Others seem constantly distracted by their phones. You are concerned because they will need to be much more organized and on top of their work as they progress through their education. You have so much material to cover to meet district guidelines, but many of your students are drowning in the amount of work they already have.

Critical Thinking

- Which organizational skills do students need to be successful in your subject or class?
- What could you do to teach these skills while still covering the material that will be on the proficiency or achievement tests the students will have to take in the spring?
- How would you help students develop an authentic sense of efficacy for guiding their own learning?



Overview and Objectives

In the past four clusters, we analyzed different aspects of learning. We considered behavioral and information processing explanations of what and how people learn. We examined complex cognitive processes such as concept learning and problem solving. These explanations of learning focus on the individual and what is happening in that person's "head." Recent perspectives have called attention to two other aspects of learning that are critical: social and cultural factors. In the previous cluster, we examined psychological and social constructivism. In this cluster, we look at social cognitive theory—a current view of learning and motivation that discusses dynamic interactions among many of the behavioral, personal, and environmental (including social and cultural) factors involved in learning and motivation.

Social cognitive theory has its roots in Bandura's (1977, 1986) early criticisms of behavioral views of learning, as you read in Cluster 7. Social cognitive theory moved beyond behaviorism to focus on humans as self-directed agents who make choices and marshal resources to reach goals. Concepts such as self-efficacy, agency, and self-regulated learning are key in social cognitive theories. These concepts are important components of motivation as well, so this cluster provides a good path from learning to the discussion of motivation in the next cluster. We end the cluster with a look back at our tour through different models of instruction. Rather than debating the merits of each approach, we will consider the contributions of these different models of instruction, grounded in different theories of learning. Don't feel that you must choose the "best" approach—there is no such thing. Even though theorists argue about which model is best, excellent teachers don't debate. They apply all the approaches, using each one when appropriate.

By the time you have completed this cluster, you should be able to:

11.1 Distinguish between social learning theory and social cognitive theory, including an explanation of triadic reciprocal causality.

11.2 Discuss the roles of observation and modeling in learning, including factors that support learning by observation.

11.3 Define self-efficacy and agency, distinguish these concepts from self-concept and self-esteem, explain the sources of self-efficacy, and discuss self-efficacy for teaching.

11.4 Describe important components of self-regulated learning.

11.5 Apply your knowledge to teach for self-efficacy and self-regulated learning.

11.6 Explain the meaning and different applications of four basic theories of learning.

OUTLINE

Teachers' Casebook—Failure to Self-Regulate: What Would You Do?
Overview and Objectives

MODULE 34: Social Cognitive Theory and Applications
Social Cognitive Theory
- A Self-Directed Life: Albert Bandura
- Beyond Behaviorism
- Triadic Reciprocal Causality

Modeling: Learning by Observing Others
- Elements of Observational Learning
- Observational Learning in Teaching

Agency and Self-Efficacy
- Self-Efficacy, Self-Concept, and Self-Esteem
- Sources of Self-Efficacy
- Self-Efficacy in Learning and Teaching
- Teachers' Sense of Efficacy

MODULE 35: Self-Regulation in Learning and Teaching
Self-Regulated Learning: Skill and Will
- How Does Self-Regulation Develop?
- A Social Cognitive Model of Self-Regulated Learning
- Reaching Every Student: Technology and Self-Regulation
- Self-Regulation of Emotions

Teaching Toward Self-Efficacy and Self-Regulated Learning
- Complex Tasks
- Agency and Control
- Self-Management
- Self-Evaluation
- Collaboration

Bringing It All Together: Theories of Learning

Cluster 11 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Failure to Self-Regulate: What Would They Do?

MODULE 34 Social Cognitive Theory and Applications

Learning Objective 11.1 Distinguish between social learning theory and social cognitive theory, including an explanation of triadic reciprocal causality.

Learning Objective 11.2 Discuss the roles of observation and modeling in learning, including factors that support learning by observation.

Learning Objective 11.3 Define self-efficacy and agency, distinguish these concepts from self-concept and self-esteem, explain the sources of self-efficacy, and discuss self-efficacy for teaching.

Social Cognitive Theory

Most of what is known today as *social cognitive theory* is based on the work begun by Albert Bandura in the 1950s at Stanford University. Before we talk about the theory, let's meet the man.

A Self-Directed Life: Albert Bandura

Albert Bandura's life story should be a movie. You could say he lived the American dream, except that he was from Canada. His parents were immigrants from Central Europe; they chose the rugged land of northern Alberta for their family farm. Bandura's parents never went to school, but they valued education. His father taught himself to read in three languages, giving young Albert a great model of self-regulated learning—a concept that figures prominently in social cognitive theory today. While attending high school, Bandura worked many jobs, including a stint as a carpenter at a furniture factory and one as a road worker on the Alaska Highway in the Yukon. He finished his undergraduate degree at the University of British Columbia in 3 years, even though he had to cram all his classes into the morning to have time for his afternoon jobs. Because he needed a morning class to fill one time slot, he enrolled in introductory psychology and found his future profession (Bandura, 2007, p. 46). His next stop was to attend a graduate school program at the epicenter of psychological research in 1950—the University of Iowa. After earning his PhD (in 3 years again), Bandura joined the faculty at Stanford University in 1953—he was 28 years old. He held emeritus status there as the David Starr Jordan Professor of Social Science in Psychology and was working in his office on a new book until the day before he died at age 95 on July 26, 2021. In 2015, Bandura received one of Canada's highest civilian honors (the Order of Canada), and in 2016, President Barack Obama bestowed upon him the U.S. National Medal of Science for his extraordinary contributions to psychological science. We dedicated this edition to Professor Bandura for his influence on our work and the field of educational psychology.

When I (Ellen writing) read Bandura's autobiography, I was struck by how much his theories reflected his life as a self-directed, self-regulating learner growing up in a challenging environment. Describing his experiences in his two-teacher high school, Bandura (2007) said:

> We had to take charge of our own learning. Self-directed learning was an essential means of academic self-development, not a theoretical abstraction. The paucity of educational resources turned out to be an enabling factor that has served me well rather than an insurmountable handicapping one. The content of courses is perishable, but self-regulatory skills have lasting functional value whatever the pursuit might be. (p. 45)

In the next sections we will look at the key features of Albert Bandura's work and social cognitive theory by considering four topics: moving beyond behaviorism, the concept of triadic reciprocal causality, the power of observational learning, and the key function of self-efficacy in the development of human agency.

Connect and Extend to PRAXIS II®

Modeling (II, B2)

Teachers often use modeling to teach students new behaviors. Identify the characteristics that tend to make models effective in instructional contexts.

Beyond Behaviorism

Bandura believed basic behavioral principles were correct as far as they went but also too limited to explain complex human thinking and learning. In his autobiography, Bandura (2007) described the shortcomings of behaviorism and the need to put people in social context:

> I found this behavioristic theorizing discordant with the obvious social reality that much of what we learn is through the power of social modeling. I could not imagine a culture in which its language; mores; familial customs and practices; occupational competencies; and educational, religious, and political practices were gradually shaped in each new member by rewarding and punishing consequences of their trial-and-error performances. (p. 55)

Social learning theory
Theory that emphasizes learning through observation of others.

Modeling
Changes in behavior, thinking, or emotions that happen through observing another person—a model.

Social cognitive theory
Theory of learning and motivation that adds to social learning theory a consideration of cognitive factors such as beliefs, self-perceptions, and expectations.

Triadic reciprocal causality
An explanation of human functioning as the interaction between personal, behavioral, and environmental influences.

As you learned in Cluster 7, Bandura's early **social learning theory** included *enactive learning* (learning through reinforcement and punishment of your *own behaviors*) and added *observational learning*, that is, learning through modeling and *observing others*. When people experience changes in their own behavior, thinking, or emotions as a result of observing another person (a model) being reinforced or punished for particular behaviors, then **modeling** has occurred. Over time, Bandura's explanations of learning included more attention to cognitive (personal) factors such as *expectations* and *beliefs* in addition to the social influences of models (Bandura, 1986, 1997, 2016, 2018). In 1986, he renamed his perspective **social cognitive theory**. This perspective retains an emphasis on the role of other people serving as models and teachers (the *social* part of social cognitive theory) but also emphasizes the role of thinking, believing, expecting, anticipating, self-regulating, and making comparisons and judgments (the *cognitive* part). Social cognitive theory is a *dynamic system* that explains human adaptation, learning, and motivation. The theory addresses how people develop social, emotional, cognitive, and behavioral capabilities; how people regulate their own lives; and what motivates them (Bandura, 2007, 2019; Bandura & Locke, 2003). Many of the concepts from this cluster will help you understand motivation in Cluster 12.

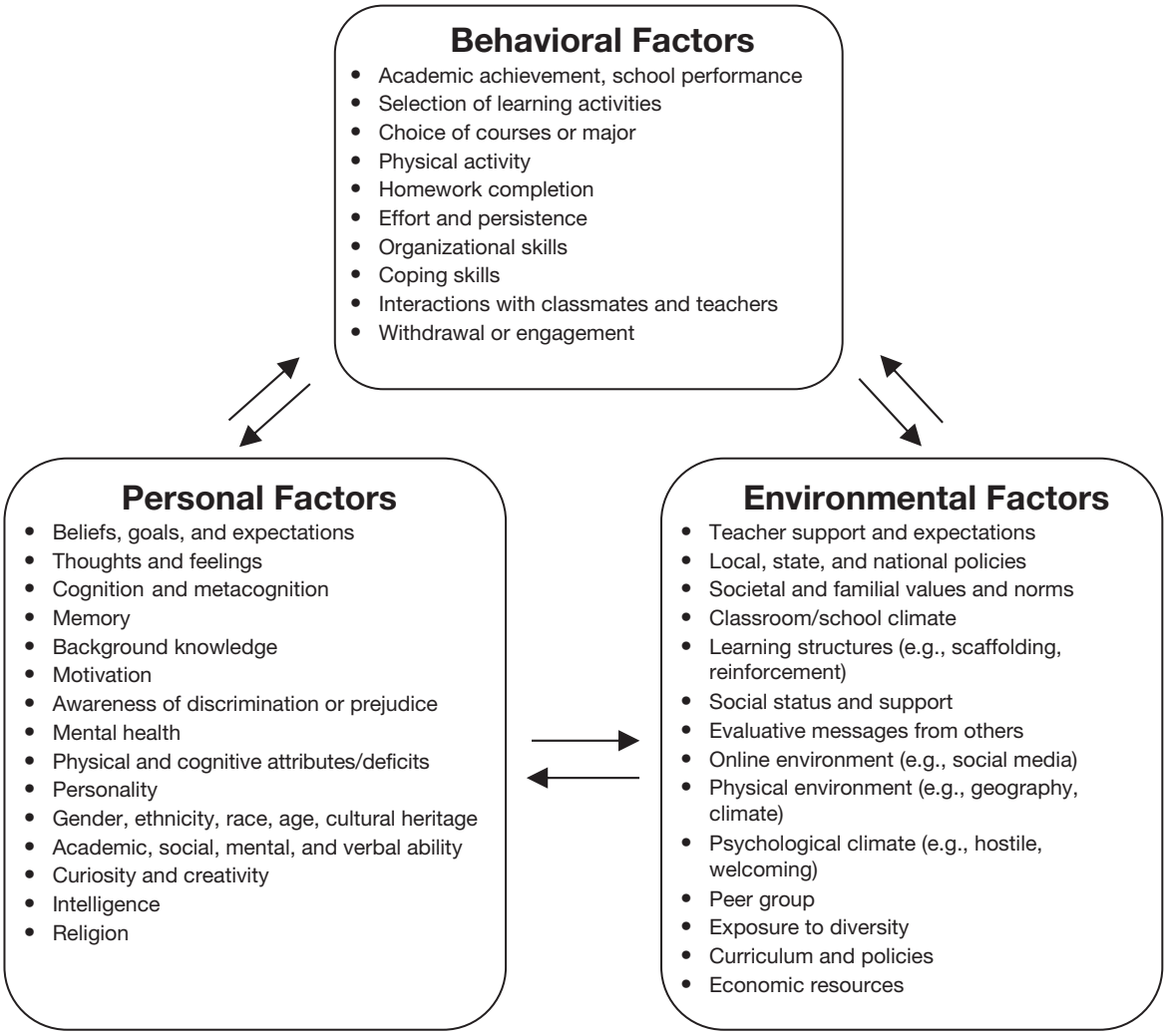
Triadic Reciprocal Causality

I claimed earlier that social cognitive theory describes a system. This system, called **triadic reciprocal causality**, is the dynamic interplay among three kinds of influences: personal, environmental, and behavioral, as shown in Figure 11.1. Personal factors (beliefs, expectations, cognitive abilities, motivation, attitudes, and knowledge), the physical and social environment (resources, consequences of actions, other people, models and teachers, and physical and virtual settings), and behavior (individual actions, choices, and verbal statements) all influence and are influenced by each other.

Figure 11.1 shows the interaction of person, environment, and behavior in learning settings (Pajares & Usher, 2008). External factors such as models, instructional strategies, classroom environments, or teacher feedback (elements of the environment for students) can affect student personal factors such as goals, sense of efficacy for the task (described in the next section), attributions (beliefs about causes for success and failure), expectations, and self-regulatory processes such as planning, monitoring, and controlling distractions (Schunk & DiBenedetto, 2020). For example, teacher feedback can lead students to feel either more confident or more discouraged, and then the students adjust their goals accordingly. Environmental factors, such as rewards for turning in homework, and personal factors, such as setting challenging goals, can encourage useful behaviors like effort and persistence that lead to successful learning (Usher & Schunk, 2018). But these behaviors also reciprocally influence personal factors. For example, as students perform better through increased effort (behavior), their self-efficacy and interest (personal factors) are likely to increase. Finally, student behaviors also affect their environment. For example, if students do not persist or if they perform poorly on assignments, teachers may change instructional strategies or learning group assignments, thus changing the learning environment for the students.

Figure 11.1 A Social Cognitive View of Reciprocal Influences in Learning

All three forces—personal, social/environmental, and behavioral—are in constant interaction. They influence and are influenced by each other.



Think for a minute about the power of triadic reciprocal causality in classrooms. If personal factors, behaviors, and the environment are in constant interaction, then cycles of events are progressive and self-perpetuating. Suppose a student had difficulties in his previous school. The first day at his new school he is late to class because he got lost in the unfamiliar building. The student happens to have several visible tattoos and pierced body parts. He is anxious about his first day and hopes to do better at this new school, but the teacher's initial reaction to his late entry and dramatic appearance is a bit hostile. The student feels insulted and responds in kind, so the teacher begins to form expectations about him and becomes more vigilant, less trusting. The student senses the distrust. He decides that this school will be just as worthless as his previous one and wonders why he should bother to try. The teacher sees the student's disengagement and invests less effort in teaching him, and the cycle continues. These reciprocal effects are more than hypothetical. Using data gathering from over 22,000 teachers and their students in 16 countries, researchers showed that teachers change their teaching practices based on how capable they feel in their teaching skills. These teaching practices, in turn, affect students' beliefs about their own capabilities to learn (Bonneville-Roussy et al., 2019). In other words, just as Bandura predicted, the beliefs and behaviors of one person

can create the environment for another! Performing well in school is related to what students believe and how motivated they are, but these beliefs are connected to whether students feel supported in their learning environment (Burns et al., 2018).

Let's look more closely at two key elements of social cognitive theory: observational learning and self-efficacy. As we examine each of these elements, we emphasize their implications for teaching.

Modeling: Learning by Observing Others

What causes an individual to learn and perform modeled behaviors and skills? Several factors play a role. First, the developmental level of the observer makes a difference in learning. As children grow older, they can focus attention for longer periods of time, more effectively identify the important elements of a model's behavior to observe, use memory strategies to retain information, and motivate themselves to practice, as you can see in Table 11.1. A second influence is the status of the model. Children are motivated to imitate the actions of others who seem competent, powerful, prestigious, and enthusiastic, so parents, teachers, older siblings, athletes, action heroes, rock stars, or film personalities may serve as models, depending on the age and interests of the child.

Third, by watching others who are similar to us, we learn about what behaviors are appropriate, and we are able to identify the range of behaviors we probably could accomplish. Children and adolescents pay close attention to models they perceive to be similar to themselves in age, gender, or race. (When you watch your favorite show, do you pay closer attention to characters who seem similar to you?) All students, no matter what their cultural background, ethnicity, socioeconomic status, or gender, can benefit from seeing successful, capable models who look and sound like them. For instance, when people in developing countries watch television shows where relatable lead characters learn how to effectively deal with the social problems they are facing (e.g., women's rights, HIV prevention, lack of educational access for girls), viewers' beliefs about what is possible for them also change (Bandura, 2016, 2019). How?

Table 11.1 Factors That Affect Observational Learning

CHARACTERISTIC	EFFECTS ON MODELING PROCESS
Developmental Status	Improvements with development include longer attention span and increased capacity to process information, use strategies, compare performances with memorial representations, and adopt intrinsic motivators.
Model Prestige and Competence	Observers pay greater attention to competent, high-status models. Consequences of modeled behaviors convey information about functional value. Observers attempt to learn actions they believe they will need to perform.
Vicarious Consequences	Consequences to models convey information about behavioral appropriateness and likely outcomes of actions. Valued consequences motivate observers. Similarity in attributes or competence signals appropriateness and heightens motivation.
Outcome Expectations	Observers are more likely to perform modeled actions they believe are appropriate, attainable, and will result in rewarding outcomes.
Goal Setting	Observers are likely to attend to models who demonstrate behaviors that help observers attain goals.
Values	Observers are more likely to attend to models who display behaviors that the observers believe are important and find satisfying.
Self-Efficacy	Observers attend to models when they believe they are capable of learning or performing the modeled behavior. Observation of similar models affects self-efficacy ("If they can do it, I can too").

Source: From Schunk, D. H. (2020). *Learning theories: An educational perspective* (8th ed.), p. 139. Reprinted by permission of Pearson Education, Inc.

Look at Table 11.1 for help finding the answer: The factors relate to how people *learn* from models, which involves goals, consequences, and expectations. If observers expect that certain actions of models will lead to particular outcomes (e.g., specific practice regimens lead to improved athletic performance) and the observers value those outcomes or goals, then the observers will pay attention to the models and try to reproduce their behaviors. (This explains why my nephew loves watching surfing videos on YouTube!) Finally, observers are more likely to learn from models if the observers have a high level of self-efficacy—if they believe they are capable of doing the actions needed to reach the goals or at least capable of learning how to do them (Schunk et al., 2014). Of course, this works both ways. Watching another person perform a skill successfully can also increase the observers' beliefs that they can do it, too. We'll examine this more later.

Elements of Observational Learning

Stop & Think Your interview for a position in the middle school is going well. Now you are asked, "Who are your 'teacher' role models? Do you see yourself doing things that teachers from your past have done? Are there teachers from films or books that you would like to emulate?"

Through observational learning, we discover not only *how* to perform a behavior but also *what will happen* to us in specific situations if we perform it. Observation can be a very efficient learning process. The first time children hold hairbrushes, cups, or baseball bats, they usually brush, drink, or swing as well as they can, given their current muscle development and coordination. Through comparison with a model, we also can identify adjustments that may produce better outcomes. To learn new behaviors or refine current abilities, Bandura (1986) proposed that four elements of observational learning are essential: paying attention, retaining information or impressions, producing behaviors, and being motivated to repeat the behaviors.

ATTENTION. To learn through observation, we have to pay attention. This includes both selective attention (paying attention to the correct cues and information) as well as sustained attention (maintaining focus). In teaching, you will have to ensure students' attention to the critical features of the lesson by making clear presentations and highlighting important points. In demonstrating a skill (for example, threading a sewing machine, performing a dissection, or operating a lathe), you may need to have students look over your shoulder as you work. Seeing your hands from the same perspective as they see their own directs their attention to the right features of the situation and makes observational learning easier.

RETENTION. To imitate the behavior of a model, you have to remember each step. This involves mentally representing the model's actions in some way, probably as verbal steps ("Hwa-Rang, the eighth form in Tae Kwon Do, is a palm-heel block, then a middle riding stance punch, then . . ."), as visual images, or both. Retention can be improved by mental rehearsal (imagining imitating the behavior) or by actual practice. Of course, the ability to watch a model via an online video enables us to offload some of the memory work to the replay function. Even so, practicing as we watch helps us remember the elements of the desired behavior, such as the sequence of steps. Ultimately, to be able to apply what we have learned, we must go through the retention phase of observational learning.

PRODUCTION. Once we "know" how a behavior should look and remember the elements or steps, we still may not perform it smoothly without a great deal of practice, feedback, and coaching about subtle points. In the production phase, practice makes the behavior smoother and more expert. However, if a child does not have the physical or developmental skills needed to produce the behavior, even extensive practice and feedback may not be enough. The ideal conditions for practice toward expert production will typically involve some form of feedback that compares the learner's performance to that of the model (e.g., specific teacher feedback, explicit coaching, reviewing video of the performance, deliberate practice of the weak parts) (Ericsson & Pool, 2016).

MOTIVATION AND REINFORCEMENT. Social cognitive theory distinguishes between acquisition and performance. We may acquire a new skill or behavior through observation, but we may not perform that behavior until we have some motivation or incentive to do so. Reinforcement can play several roles in observational learning. If we anticipate being reinforced for imitating the actions of a model, we may be more motivated to pay attention, remember, and reproduce the behaviors. In addition, reinforcement is important in maintaining learning through persistence. Without some kind of reinforcing consequence, new behaviors will likely disappear (Schunk, 2020). For example, if an unpopular student adopted the dress of the "in" group but was ignored or ridiculed, it is unlikely that the imitation would continue. Similarly, learning new academic tasks is usually accompanied by some failure—and reinforcement for progressive gains helps learners maintain focus on their growth rather than on their current struggles.

Direct reinforcement
Reinforcement given after successful completion of a task.

Vicarious reinforcement
Increasing the chances that we will repeat a behavior by observing another person being reinforced for that behavior.

Self-reinforcement
Controlling (selecting and administering) your own reinforcers.

Bandura has identified three forms of reinforcement that can encourage observational learning. First, of course, the observer may reproduce the behaviors of the model and receive **direct reinforcement**, as when a gymnast successfully executes a front flip/roundoff combination and the coach/model says, "Excellent!"

But the reinforcement need not be direct—it may be **vicarious reinforcement**. The observers may simply see others reinforced for a particular behavior and then increase their production of that behavior. For example, if you compliment two students on the attractive illustrations in their lab reports, several other students who observe your compliments may turn in illustrated lab reports next time. Most media ads hope for this kind of effect. People in commercials become deliriously happy when they drive a particular car or ingest a specific energy drink, and the viewer is supposed to do the same; the viewer's behavior is reinforced vicariously by the actors' obvious pleasure. Punishment can also be vicarious: You may slow down on a stretch of highway after seeing several people get speeding tickets there. A student may remove her comments on Instagram after seeing a friend teased for making similar posts.

The final form of reinforcement is **self-reinforcement**, or controlling your own reinforcers—one aspect of *self-regulation* described later in this cluster. Self-reinforcers may be intrinsic (e.g., feelings of satisfaction at a job well done) or extrinsic (e.g., rewarding yourself with a special treat after accomplishing a goal). If one goal of education is to produce people who are capable of educating themselves, then students must learn to manage their own lives, set their own goals, and provide their own reinforcement. In adult life, rewards are sometimes vague, and goals often take a long time to reach. Think about how many small steps are required to complete an education and find your first job. In teaching, sometimes self-reinforcement is all that keeps you going in the face of difficult students and demanding parents. Life is filled with tasks that call for this sort of self-regulation (Rachlin, 2004).

Connect and Extend to PRAXIS II®
Observational Learning (II, B2)
Identify situations in which observational learning may be a wise approach, and describe the essential elements of effective observational learning.

Social cognitive theory has some powerful implications for teaching. Let's look more closely at using observational learning in teaching.

Observational Learning in Teaching

Stop & Think How would you incorporate observational learning into your teaching? What are the skills, attitudes, and strategies that can be modeled in teaching your subject?

We have explored how observational learning takes place and examined the factors that influence it. Let's now take a look at five possible outcomes of observational learning as they occur in classrooms: directing attention, encouraging existing behaviors, changing inhibitions, teaching new behaviors and attitudes, and arousing emotions (Schunk, 2020).

DIRECTING ATTENTION. By observing others, we not only learn about actions but also notice the objects involved in the actions. For example, in a preschool class, when one child plays enthusiastically with a toy that has been ignored for days, many other children may want to have the toy, even if they play with it in different ways or simply carry it around. This happens, in part, because the children's attention has been drawn to that particular toy. I can remember

trying to teach my middle school students difficult vocabulary words by providing definitions. Seeing their boredom, I one day decided to ask students to take turns writing a funny or grotesque sentence on the board that included the target word. Just seeing their peers stand in front of the class and read their clever sentences held the observers in rapt attention.

FINE-TUNING ALREADY-LEARNED BEHAVIORS. All of us have had the experience of looking for cues from other people when we find ourselves in unfamiliar situations. Observing the behavior of others tells us which of our already-learned behaviors to use: the proper fork for eating the salad, when to leave a gathering, what kind of language is appropriate, and so on. Adopting the dress and grooming styles of TV or music idols is another example of this kind of effect.

STRENGTHENING OR WEAKENING INHIBITIONS. If class members witness one student breaking a class rule and getting away with it, they may learn that undesirable consequences do not always follow rule breaking. If the rule breaker is a well-liked, high-status class leader, the effect of the modeling may be even more pronounced. This **ripple effect** (Kounin, 1970) can work to the teacher's benefit. When the teacher deals effectively with a rule breaker, especially a class leader, the idea of breaking this rule may be inhibited for the other students viewing the interaction. This does not mean that teachers must reprimand each student who breaks a rule, but once a teacher has called for a particular action, following through is an important part of capitalizing on the ripple effect.

Ripple effect
"Contagious" spreading of behaviors through imitation.

TEACHING NEW BEHAVIORS. William James (1899/2001) said, "The teacher who meets with the most success is the teacher whose own ways are the most imitable" (p. 26). Modeling has long been used to teach dance, sports, and crafts, as well as skills in subjects such as food science, chemistry, welding, and language learning. Cognitive modeling can also be applied deliberately in the classroom to teach mental skills and to broaden horizons—to teach new ways of thinking, such as thinking through the steps in a complex math problem (Zimmerman, 2013). Teachers serve as models for a vast range of behaviors, from pronouncing vocabulary words to reacting to the seizure of a student with epilepsy, to being enthusiastic about learning. For example, a teacher might model critical thinking skills by thinking "out loud" about a student's question. Or a teacher concerned about girls who seem to have stereotyped ideas about their career prospects might invite women with nontraditional jobs to speak to the class or expose students to exemplary models in science, technology, engineering, and mathematics (STEM; for example, see engineergirl.org). Teachers can demonstrate their love of reading or music or art or history by sharing their favorite books, films, artists, and so on. Studies indicate that modeling can be most effective when the teacher makes use of all the elements of observational learning—attention, retention, production, and especially reinforcement and practice. It is important to select appropriate models, however. For example, students who doubt their own abilities might be best paired with a peer who keeps trying and finally masters the material rather than someone who gets it right on the first try with little effort (Schunk, 2020).

AROUSING EMOTION. Finally, through observational learning, people may develop emotional reactions to situations they have never experienced personally. Hearing, watching, or reading about a situation are powerful forms of observation. This may be most obvious through fear-inducing observations. News reports of shark attacks have many of us anxious about swimming in the ocean. The tragedies of school shootings reported in the media prompt parents, teachers, and students alike to develop new concerns over safety in schools. Some terrible examples of modeling occur with hate group activities, "copycat killings," or suicide clusters in schools. When frightening things happen to students who are similar in age or circumstances, your students may need to be given an opportunity to talk about their emotions. But not all observations lead to negative emotions. Watching or reading about the courageous acts of others who spend their lives advocating for human and civil rights can lead to emotional responses that promote social change. Indeed, diverse media have made it possible to observe distant or previously unimaginable realities. For example, youth participating in the Young Voices for the Planet program

have engaged in a social network video campaign featuring youth-led activities that help protect the environment and combat climate change (Bandura & Cherry, 2020). Seeing media portrayals of acts of kindness or heroism can arouse emotion that may prompt imitative behaviors or increased "faith" in oneself and humanity.

The *Guidelines: Using Observational Learning* will give you some ideas about using observational learning in the classroom.

One final thing you can do to promote healthy observational learning is to help your students select appropriate models. Bandura (2016) pointed out that the environments in which we live are not just externally imposed; we have some say in how we select and

GUIDELINES

Using Observational Learning

Model behaviors and attitudes you want your students to learn.

Examples

1. Show enthusiasm for the subject you teach.
2. Be willing to demonstrate both the mental and the physical tasks you expect the students to perform. I once saw a teacher sit down in the sandbox while her 4-year-old students watched her demonstrate the difference between "playing with sand" and "throwing sand."
3. Model good problem solving—think out loud as you work through a difficult problem. A language arts teacher might stop and say, "Now let me see if I remember what happened so far" or "That was a hard sentence. I'm going to read it again."
4. Model coping skills, persistence, and effort. Engage with a difficult problem, even if you seem to reach a dead end. Try new strategies or take a break and return to the problem later.
5. Model your expectations. I remember seeing my fellow teachers talking to one another during a school assembly while occasionally looking up to chastise students who were doing the same thing. Students recognize hypocrisy. Promote desired behaviors by engaging in them yourself.

Use peers, especially class leaders, as models.

Examples

1. In group work, pair students who do well with those who are having difficulties. Alternate this with pairings of peers at similar levels (see Cluster 10 for more suggestions).
2. When choosing a model, alternate between *coping models* who work through problems slowly and correct their errors as they work and *mastery models* who solve problems quickly and without error.
3. Ask students to demonstrate the difference between "whispering" and "silence—no talking."

Make sure students see that positive behaviors lead to reinforcement for others.

Examples

1. Point out the connections between positive behavior and positive consequences in stories.
2. Be fair in giving reinforcement. The same rules for rewards should typically apply to both the students with problems and the students who do not cause trouble.

Enlist the help of class leaders in modeling behaviors for the entire class.

Examples

1. Ask a well-liked student to be friendly to an isolated or fearful student.
2. Let high-status students lead an activity when you need class cooperation or when students are likely to be reluctant at first. Popular students can model dialogues in foreign-language classes or be the first to tackle dissection procedures in biology.

For more information on observational learning, go to http://www.readwritethink.org and search for "modeling."

create our environments—including our social ones. For example, high school students choose their classes, their peer groups, their extracurricular activities, and even their social media friends. Helping students reflect on how these social groups influence their behaviors might empower them to choose wisely.

Agency and Self-Efficacy

Remember that social cognitive theory emphasizes the dynamic interaction of personal, behavioral, and environmental events in shaping human lives. Bandura (1997) placed particular emphasis on the personal factors. Because of people's capacity for self-influence, we have a role in determining what we learn, with whom we interact, and how we act. Bandura (2016) called this **human agency**—"To be an agent is to exert intentional influence over one's functioning and over the course of events by one's actions" (p. 4). Agency involves the ability to make intentional choices and plans, design appropriate courses of action, and then motivate and regulate the execution of these plans and actions. This is the major difference between social cognitive theory and behaviorism: In social cognitive theory, we can change or ignore our environments, control our own behavior, support the actions of others, and take charge of our lives. Behaviorism removes the "personal" from the equation and focuses entirely on how the reinforcing (or punishing) environment predicts what we do. When we discuss self-regulation later in the cluster, you will see how students and teachers can become more *agentic*—more self-directing and in charge of their own learning and motivation.

Human agency
The capacity to coordinate learning skills, motivation, and emotions to reach your goals.

Central to our own agency are the beliefs we hold about our own capabilities, referred to as **self-efficacy**. Simply put, self-efficacy answers the question "Can I do this?" We ask ourselves this question about all sorts of situations—Can I do math? Can I keep my cool when my friend talks about me behind my back? Can I teach this group of students? Can I do 10 push-ups? Can I stop checking my phone 100 times a day for new messages? Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Learners' self-efficacy is distinct from but related to what they expect the outcomes of their behavior will be (e.g. "Will I succeed or fail? Will I be liked or laughed at?" "Will I be more accepted by teachers in this new school?"). How students answer these questions depends on their beliefs about their personal competence or effectiveness in a given area. Researchers have shown that self-efficacy is essential for positive student outcomes across grade levels and content domains. Students with high self-efficacy exert greater levels of effort, persistence, and resilience when engaged in challenging tasks—as well as experience lower levels of stress and anxiety for the task (Klassen & Usher, 2010; Schunk & DiBenedetto, 2020). In studies of students going from middle through high school, students with a higher level of self-efficacy for having control over their academic outcomes had higher levels of confidence in their academic abilities, earned higher grades, were more engaged, and were more likely to graduate (Anderson et al., 2019; Caprara et al., 2005).

Self-efficacy
A sense of being able to deal effectively with a particular task. Beliefs about your personal capabilities in a particular situation.

Self-Efficacy, Self-Concept, and Self-Esteem

Most people assume that self-efficacy is the same as self-concept or self-esteem, but it isn't. Although these terms refer to self-beliefs, they differ in important ways. *Self-efficacy* refers to a "context-specific assessment of competence to perform a specific task" (Pajares, 1997, p. 15). *Self-concept*, on the other hand, has historically referred to a more global self-perception. Self-concept is a judgment based on both external and internal comparisons, using other people or other aspects of the self as frames of reference (Marsh et al., 2019). It answers the questions "How good am I at this? How am I compared to others?" But self-efficacy focuses on your perceived capability to successfully accomplish a particular task—the question is "Can I do this?" What matters in self-efficacy judgments is whether *you* believe you can do it, not whether others would be successful. Also, self-efficacy beliefs are strong predictors of behavior, but self-concept has typically shown weaker predictive

power, particularly when it comes to predicting how well students will do on a specific task (Anderman & Anderman, 2014; Bandura, 1997).

Self-efficacy is context specific—that is, people's beliefs about what they can do depend on the subject area or the task they are facing. For example, my sense of efficacy for singing is really low, but I feel confident in my ability to read a map and navigate (except in certain cities like Rome that are hopeless). Even young children have developed different efficacy beliefs for different tasks. One study found that by the first grade, students already differentiated among their sense of efficacy for reading, for writing, and for spelling (Wilson & Trainin, 2007).

Self-efficacy is concerned with judgments of personal competence; self-esteem is concerned with judgments of self-worth (Usher, 2015). Self-esteem is determined in large part by the *value* we place on our performance in a domain (math, appearance, singing, soccer, etc.) and our concern over what others think about our competence (Harter & Whitesell, 2003). Self-esteem is not affected if we feel incompetent in areas we don't really value. There is no consistent relationship between self-esteem and self-efficacy. It is possible to feel highly efficacious in one area and still not have a high level of self-esteem, or vice versa (Valentine et al., 2004). As I confessed earlier, I have very low self-efficacy for singing, but my self-esteem is not affected, probably because my life does not require singing. But if my self-efficacy for teaching a particular class (my teaching self-efficacy) started decreasing after several bad experiences, I know my self-esteem would suffer because I value teaching.

Mastery experiences
Students' awareness of their own previous successful performance—the most powerful source of efficacy information.

Vicarious experiences
Accomplishments that are modeled by someone else.

Social persuasion
Evaluative messages that students receive from people around them that convey information about their capabilities.

Sources of Self-Efficacy

How is it that we come to believe we are capable in one area and hopeless in another? Bandura (1997) identified four sources of self-efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional arousal. **Mastery experiences** refer to how we interpret our own direct experiences—usually this is the most powerful source of efficacy information. Successes raise efficacy beliefs, while failures lower them (Usher, Ford, et al., 2019). Bandura (1997) also referred to these as "enactive" experiences, given that we do not necessarily interpret all of our performances as masterful.

Sometimes we have little or no direct experience in a domain. We therefore base our self-efficacy judgments on other sources, such as the **vicarious experiences** we have through observing the performances of others. Watching a model not only teaches us new ways of doing things but also alters our beliefs about what we can do. When I was young, my close friend Jessica could play a fierce Mozart sonata. With my chin perched at the end of the piano, I watched her fingers glide across the keys and said to myself, "If she can play this, then I can, too." When an observer feels similar to the model, the vicarious influence on self-efficacy is stronger (Gerber et al., 2018). In school, a peer's good performance can enhance other students' own sense of efficacy. When an esteemed model fails, on the other hand, our self-efficacy might decrease. There are some exceptions to this pattern, however. For example, watching someone struggle using poor skills might convince observers that they can succeed at the same task by implementing better skills.

The popularity of skill-based television shows and online videos that model how to cook, redesign your kitchen, improve your golf swing, change the battery in your car, or do a new dance move demonstrates the influence of vicarious experiences. These are particularly effective when viewers can identify with the people in the show. In some circumstances, vicarious experiences can be a powerful source of self-efficacy. Seeing figures from history, social rights activists, and even fictional characters stand up for themselves or their cause can convince observers that they can too (Morgenroth et al., 2015). Models who counteract gender- and race-based stereotypes, so long as observers' exposure to them is somewhat long term, can play an important role in the self-efficacy of people who are engaging in domains where they are underrepresented (e.g., women, people of color; Olsson & Martiny, 2018; Zeldin et al., 2008).

A third source of self-efficacy, **social persuasion**, refers to the evaluative messages students receive from those around them. These messages take many forms, both

overt, like a "pep talk" or specific performance feedback, and covert, such as a teacher's tendency to avoid calling on certain students to answer difficult questions. Social persuasion alone may not always create enduring increases in self-efficacy, but a persuasive boost in self-efficacy can lead a student to make an effort, attempt new strategies, or try hard enough to succeed (Bandura, 1982). Social persuasion from peers or trusted experts such as teachers can counter occasional setbacks that might have instilled self-doubt and interrupted persistence. The potency of persuasion depends on the credibility, trustworthiness, expertise, and/or status of the persuader. For example, teachers' evaluations of their students have a more powerful effect on students' self-efficacy when students view their teacher as highly credible (Won et al., 2017). During skill development, people may be more inclined to pay attention to what others tell them about their abilities (Bandura, 1997). Social persuasion that highlights prior successes (mastery) on similar tasks, identifies short-term goals and accomplishments, or focuses on the importance of effort is more likely to boost self-efficacy and initiate successful performance (Bandura, 1997; Usher & Pajares, 2008).

A final source of self-efficacy is how students interpret the level of **physiological or emotional arousal** that they experience before or during an activity. For instance, the thought of giving a public speech makes a middle school student's palms sweat and her chest tighten. She interprets this as a sign that she is not capable of speaking. We read our emotions and bodies in ways that alter our perceptions of our capabilities (Usher & Pajares, 2009). For example, when asked what makes him feel less confident in math, a high school student in one of my studies said, "Math makes me just want to throw my freaking guts up" (Usher, Ford, et al., 2019, p. 46). Whether negative or positive, a strong physiological response can have a profound effect on self-efficacy. As you think about the task of teaching, are you anxious and worried (lower self-efficacy) or excited and "psyched" (higher self-efficacy)? At times you can help students reappraise or relabel their arousal—they are not anxious, they are psyched and ready! Table 11.2 summarizes the sources of self-efficacy.

Physiological or emotional arousal
Physical and psychological reactions causing a person to feel alert, attentive, wide awake, excited, or tense.

Some evidence suggests that students' personal or cultural backgrounds may be related to how they interpret the sources of self-efficacy (Usher & Weidner, 2018). For instance, Butz and Usher (2015) asked 2,500 upper elementary and middle school students about the sources of their self-efficacy in reading and math. Girls were more likely than boys to list social sources of their self-efficacy (i.e., vicarious experience and social persuasion). Context also mattered. Many students reported different sources of self-efficacy in math and reading. In other circumstances, such as online statistics learning, students draw from all four of the sources listed in Table 11.2 when forming their self-efficacy (Huang et al., 2020). Other cultural differences can affect how self-efficacy develops. One study found that the math self-efficacy of adolescents in Korea and the Philippines was based more on social persuasion from peers and parents than on other sources (Ahn et al., 2016). Mindful instruction will include approaches that support learners' self-efficacy in different ways.

Table 11.2 Sources of Self-Efficacy

SOURCE	EXAMPLE
Mastery Experiences	Past successes and failures in similar situations, as perceived by the individual. To increase self-efficacy, the success must be attributed to the ability, effort, choices, and strategies of the individual—not to luck or extensive help from others.
Vicarious Experiences	Seeing other people like you succeed on a task or reach a goal that is similar to the one you face.
Social Persuasion	Encouragement, informational feedback, useful guidance from a trusted source, evaluation.
Physiological Arousal	Positive or negative arousal—excitement and a feeling of being "psyched" and ready (increases self-efficacy) or a sense of anxiety and foreboding (decreases self-efficacy).

Self-Efficacy in Learning and Teaching

Stop & Think On a scale from 1 to 100, how confident are you that you will finish reading this cluster today?

Let's assume your sense of efficacy is around 90 out of 100 for completing this cluster. Higher self-efficacy leads to greater effort and persistence in the face of setbacks, so even if you are interrupted in your reading, you are likely to return to the task. I believe I can finish writing this section today, so I have resumed work on it after my computer crashed and I had to start over on several pages.

Self-efficacy also influences motivation and performance through goal setting (Schunk & DiBenedetto, 2020). If we have a high sense of efficacy in a given area, we will set higher goals, be less afraid of failure, and find new strategies when old ones fail. If your sense of efficacy for reading this cluster is high, you are likely to set high goals for completing it—maybe you will take some notes, too. If your sense of efficacy is low, however, you may avoid the reading altogether or give up easily when problems arise or you are interrupted with a better offer (Usher & Schunk, 2018).

Research indicates that performance in school is improved and self-efficacy is increased when students (a) adopt short-term goals so it is easier to judge progress; (b) are taught to use specific learning strategies such as outlining or summarizing that help them focus attention; and (c) are made aware of their own achievements, rather than simply praised for their engagement, because achievement signals increasing competence (Pajares, 2006). See the *Guidelines: Supporting Self-Efficacy* for ideas about how you can support students' self-efficacy (and your own!).

In schools, we are particularly interested in self-efficacy for learning mathematics, writing, history, language, science, health promotion, and other subjects, as well as self-efficacy for using learning strategies and for handling the many other challenges that classrooms present. Consider a few findings from research with students. Self-efficacy is related to school performance for students from elementary school through college (Honicke & Broadbent, 2016; Richardson et al., 2012). But self-efficacy has also been shown to predict adolescents' life satisfaction (Burger & Samuel, 2017), use of deep processing learning strategies for college students (Prat-Sala & Redford, 2010), elementary and high school students' writing self-regulation and performance (Zumbrunn et al., 2020), college major and career choice (Lent et al., 2017), and performance in college for older students (Elias & MacDonald, 2007). The value of self-efficacy seems to cut across sociocultural contexts. For example, self-efficacy is related to math/science goals and interests for Mexican American youth (Navarro et al., 2007), staying in school for Italian secondary students (Caprara et al., 2008), language performance for French elementary school students (Joët et al., 2011), reading fluency in Finnish primary students (Peura et al., 2019), computer and information literacy for adolescents from 13 countries (Hatlevik et al., 2018), and career selection for African American (Dickinson et al., 2017) and Asian American (Kantamneni et al., 2018) college students.

Maybe you are thinking, sure, higher self-efficacy is related to higher achievement because students who have more ability have higher self-efficacy. But these relationships between self-efficacy and achievement hold even when we take ability into account. For example, when students with the same ability in math and reading are compared, the ones with higher self-efficacy perform better (Grigg et al., 2018; Usher, Li, et al., 2019). Beliefs really do matter! Self-efficacy encourages higher goals, persistence, and effort. People with high self-efficacy are better equipped to take charge of their own lives—they can act with *agency*.

What is the most motivating level of efficacy? Should students be accurate, optimistic, or pessimistic in their estimations? Evidence indicates that a higher sense of self-efficacy supports motivation, even when the belief is a *slight* overestimation (Bandura, 1997). Children and adults who are optimistic about the future are more mentally and physically healthy, less depressed, and more motivated to achieve (Seligman, 2006). As we saw in Cluster 2, maintaining an optimistic self-view may also serve to buffer students from the negative effects of experiencing prejudice and discrimination. After examining almost

GUIDELINES

Supporting Self-Efficacy

Emphasize students' progress in a particular area.

Examples

1. Return to earlier material students have learned, and show how much "easier" it is now.
2. Encourage students to improve on projects as they learn more.
3. Keep examples of particularly good work in portfolios as well as work that shows growth and improvement over time, and periodically have students review and reflect on their improvements.

Set learning goals for your students, and model a mastery orientation for them.

Examples

1. Guide students to set goals that focus on gaining skill, competency, or understanding.
2. Recognize progress and improvement. Avoid nonspecific praise.
3. Share examples of how you have developed your abilities in a given area, and provide other models of achievement who are similar to your students—no superhuman models whose accomplishments seem unattainable.
4. Share stories about students from a variety of circumstances who succeeded in spite of physical, mental, social, or economic challenges.
5. Don't excuse failure because a student has problems outside school. Help the student succeed inside school.

Make specific suggestions for improvement, and revise grades when improvements are made.

Examples

1. Return work with specific comments noting what the students did right, what they did wrong, and why they might have made the mistakes.
2. Experiment with peer editing or the use of peer examples, minimizing personal comparisons.
3. Show students how their revised, higher grade reflects greater competence and raises their class average.

Stress connections between past efforts and past accomplishments.

Examples

1. Have individual goal-setting and goal-review conferences with students in which you ask students to reflect on how they solved difficult problems.
2. Confront self-defeating, failure-avoiding strategies directly.
3. Use evidence from the students' past accomplishments to convey your belief in their capability for growth.

For more information on self-efficacy, go to the "P20 Motivation and Learning Lab" website.

140 studies of motivation, Sandra Graham found that many African American students reported strong self-concepts, **resilience**, and high expectations, even in the face of difficulties (Graham, 1996; Graham & Taylor, 2002).

As you might expect, there are dangers in underestimating personal capabilities because then students are less likely to put forth effort and may give up more easily. But there are dangers in continually overestimating one's efficacy as well. Students who think that they are better readers than they actually are may not be motivated to go back and repair misunderstandings as they read. They don't discover that they didn't really understand the material until it is too late (Pintrich & Zusho, 2002). Students may be especially prone to overestimate their capabilities when a task is new or unfamiliar. Helping students assess the demands of the task and to evaluate their self-efficacy accordingly is important for supporting students' academic skills and development (Osterhage et al., 2019).

Teachers' Sense of Efficacy

You saw in Cluster 1 that much of my own research (Anita writing here) has focused on **teachers' sense of efficacy**, defined as teachers' beliefs that they can reach even difficult students to help them learn. This confidence belief appears to be one of the few personal characteristics of teachers that predict student achievement and motivation (Burić & Kim, 2020; Fackler et al., 2021; Lazarides et al., 2018; Woolfolk Hoy et al., 2009). When teachers take responsibility for student success or failure (rather than assigning that responsibility to student ability or to external barriers), then the teachers are more "intentional" in their approaches to reaching their students and are more successful in meeting their learning needs (Putman et al., 2009). A review of 165 studies showed that teachers with higher self-efficacy report greater job satisfaction and commitment and lower feelings of burnout (Zee & Koomen, 2016; and see Klassen et al., 2011). On the other hand, teachers who reported high emotional exhaustion and low self-efficacy were more likely to use harsher disciplinary sanctions against their students (Eddy et al., 2020). Of course, the relationship between teacher self-efficacy and these variables is reciprocal—they affect each other. For example, when teachers have a higher sense of efficacy, they teach more effectively and their students learn more, and when students learn more, teacher self-efficacy grows (Holzberger et al., 2013).

Most researchers agree that teachers' sense of efficacy is multidimensional (Fackler et al., 2021; Tschannen-Moran et al., 1998). Indeed, teachers are responsible for many different skills—they must design and deliver lessons successfully, manage the classroom flow and student behavior, and promote a high level of student engagement. Teaching successfully through and beyond a pandemic requires an ability to navigate multiple technologies (Cheng et al., 2020). Teachers also must be able to reach students from different backgrounds and with unique learning needs. Remember that self-efficacy is task-specific; teachers might feel highly confident in one area but full of self-doubt in another.

Teachers' sense of efficacy
Teachers' beliefs about how capable they are of reaching even the most difficult students and helping them learn.

How does a sense of efficacy for teaching develop? Teachers generally rely on the same four sources described earlier when judging their capabilities, although the interplay of these sources may be more complex for teachers than for students (Morris et al., 2017; Yada et al., 2019). Building a flexible set of instructional tools and strong content knowledge helps teachers gain a sense of mastery for their craft. Socially transmitted information might be just as powerful as mastery experience when it comes to self-efficacy for teaching. After all, to find out whether we are effective as teachers, we need feedback from our students. Teaching is an inherently social act. Evaluations by students, parents, and administrators convey important information about how well we are doing.

Vicarious experience is another fundamental source of teaching self-efficacy. Aspiring teachers might watch video playbacks of their own mock lessons or pay close attention to how experienced teachers manage their classes. In one study, preschool teachers who discussed video playback of their teaching with the support of an instructional coach reported higher self-efficacy than did teachers who did not (von Suchodoletz et al., 2018). Both self-modeling and social modeling can lead to changes in teaching self-efficacy. Working with a proficient model who is also supportive can boost a new teacher's self-efficacy. Klassen and Durksen (2014) found that the more support Canadian preservice teachers received from their cooperating mentor teachers, the more their self-efficacy increased and their stress decreased during an 8-week practicum. Lastly, teachers also read their own emotional and physiological states related to teaching as a sign of their efficacy or inefficacy for the task. Anxious daydreaming about classroom catastrophes can undermine self-efficacy. Feeling "in the zone" while teaching can signal to teachers that they have what it takes to help students grow.

What is the optimal self-efficacy level for a teacher to have? As with any kind of self-efficacy, there may be both benefits and dangers in overestimating capabilities. Optimistic teachers probably set higher goals, work harder, reteach when necessary, and persist in the face of problems. But when beginning teachers overrate their abilities, they don't take

the steps necessary to improve their skills—until they are confronted with serious problems. So some benefits might follow from having doubts about your efficacy. As Wheatley (2002) pointed out, sometimes" doubt motivates change" (p. 18).

Let's revisit Bandura's (1997) powerful assertion that "people's level of motivation, affective states, and actions are *based more on what they believe* than on what is objectively true" (p. 2, emphasis added). Both teachers' and students' beliefs are guides to what they will do and feel. One area in which self-efficacy plays an important role is in self-regulation. Unless we believe we can regulate the many demands of being human, we will likely spend our time reacting to life's circumstances rather than proactively exercising our own agency. We turn to this issue next. How can you help your students (and yourself) to lead a self-directed, self-regulated life?

Module 34 Summary

Social Cognitive Theory (pp. 469–472)

Distinguish between social learning and social cognitive theories. Social learning theory expanded behavioral views of reinforcement and punishment. In behavioral views, reinforcement and punishment directly affect behavior. In social learning theory, observing another person, a model, and being reinforced or punished can have similar effects on the observer's behavior. Social cognitive theory expands social learning theory to include cognitive factors such as beliefs, expectations, and perceptions of self. Current social cognitive theory is a dynamic system that explains human adaptation, learning, and motivation. The theory addresses how people develop social, emotional, cognitive, and behavioral capabilities; how people regulate their own lives; and what motivates them.

What is triadic reciprocal causality? Triadic reciprocal causality is the dynamic interplay among three kinds of influences: personal, environmental, and behavioral. Personal factors (beliefs, expectations, cognitive abilities, motivation, attitudes, and knowledge), the physical and social environment (resources, consequences of actions, other people, models and teachers, and physical settings), and behavior (individual actions, choices, and verbal statements) all influence and are influenced by each other.

Modeling: Learning by Observing Others (pp. 472–477)

What is modeling? Learning by observing others is a key element of social cognitive theory. Modeling is influenced by the developmental characteristics of the observer, the status and prestige of the model, the consequences of the model's actions as seen by the observer, the observer's expectations about performing the observed behaviors (will I be rewarded?), the links that the observers perceive between their goals and the models' behaviors (will doing what the model does get me what I want?), and the observer's self-efficacy (can I do it?).

What kinds of outcomes can observational learning encourage? Observational learning can lead to five possible outcomes: directing attention, encouraging existing behaviors, changing inhibitions, teaching new behaviors and attitudes, and arousing emotions. By directing attention, we gain insight into how others do things and what objects are involved in their actions. Encouraging or fine-tuning existing behaviors can lead to the development of good habits or can make work more efficient. Observing others also has the capacity to cue us in to others' attention, which can cause us to become more or less "self-conscious" about our behavior; when others are doing something, it's easier for us to do the same. Young children in particular learn by watching and emulating others, but everyone can gain insight into how something is done well (or poorly) by observing someone else do it. Finally, observing can lead to the association of emotions with certain activities. If others are observed enjoying an activity, the observer may learn to enjoy the activity as well.

Agency and Self-Efficacy (pp. 477–483)

What is self-efficacy, and how is it different from other self-schemas? Self-efficacy is distinct from other self-schemas in that it involves judgments of capabilities specific to a particular task. Self-concept is a more global construct that contains more general evaluative perceptions about

the self in comparison to others. Self-efficacy also differs from self-esteem. Self-efficacy is concerned with judgments of personal capabilities; self-esteem is concerned with judgments of self-worth.

What are the sources of self-efficacy? Four sources of self-efficacy are direct experiences (of mastery or failure), vicarious experiences (performances that are modeled by someone else), social persuasion (evaluative judgments by others or specific performance feedback), and level of emotional or physiological arousal you experience as you face the task.

How does self-efficacy affect motivation? Greater self-efficacy leads to greater effort, persistence in the face of setbacks, higher goals, and finding new strategies when old ones fail. If sense of efficacy is low, however, people may avoid a task altogether or give up easily when problems arise.

What is teachers' sense of efficacy? One of the few personal characteristics of teachers related to student achievement is a teacher's sense of self-efficacy—the belief that he or she can reach even difficult students to help them learn. Teachers with a high sense of efficacy work harder, persist longer, and are less likely to experience burnout. Teachers' sense of efficacy is higher in schools where the other teachers and administrators have high expectations for students and where teachers receive help from their principals in solving instructional and management problems. Self-efficacy grows from real success with students, so any experience or training that helps you succeed in the day-to-day tasks of teaching will give you a foundation for developing a sense of efficacy in your career. There may be some benefits to a lower sense of efficacy, if this encourages teachers to pursue professional development and improvement.

MODULE 35 Self-Regulation in Learning and Teaching

Learning Objective 11.4 Describe important components of self-regulated learning.

Learning Objective 11.5 Apply your knowledge to teach for self-efficacy and self-regulated learning.

Learning Objective 11.6 Explain the meaning and different applications of four basic theories of learning.

Self-regulation
Process of activating and sustaining thoughts, behaviors, and emotions in order to reach goals.

Self-regulated learning
A view of learning that emphasizes the role of both skill and will when analyzing learning tasks, setting goals, applying skills, maintaining motivation, monitoring progress, and making adjustments about how learning is carried out.

Self-Regulated Learning: Skill and Will

As you may remember from the beginning of this cluster, Albert Bandura said his early education in a tiny school in Canada had given him a set of self-regulation skills that lasted a lifetime. He believed that a major goal of all education is to "equip students with the intellectual tools, self-beliefs, and self-regulatory capabilities to educate themselves throughout their lifetime" (Bandura, 1993, p. 136). **Self-regulation** is the process we use to activate and sustain our thoughts, attention, behaviors, and emotions in order to reach our goals (Perry & Rahim, 2011). When the goals involve learning, we talk about **self-regulated learning**. Self-regulated learners have the *skill* and *will* to learn—they are "metacognitive, motivated to learn, and strategic" (Perry & Rahim, 2011, p. 122). This means they have a combination of academic learning skills, self-awareness, self-control, and motivation for learning. Self-regulated learners are also able to adapt their behaviors to the particular conditions they face and to inhibit the desire to act when doing so would be inappropriate or disadvantageous.

To continue learning independently throughout life, you must be self-regulated—what we sometimes refer to in conversations as a *self-starter*. But starting an activity is only part of being a good self-regulator. With so much information and distraction instantly at our fingertips on our digital devices, remaining deeply engaged in learning can be a challenge. How do you persist and stay focused on your goal as you browse all that

information and are distracted by texts, tweets, and fascinating videos of cute kittens? Or, as someone recently posted on my social media feed, "Do you control your technology, or does it control you?"

Stop & Think Think about the class you are taking for which you are using this textbook. On a 7-point scale—from 1 = *not at all true of me* to 7 = *very true of me*—answer the following questions:

1. When I study for a test, I try to put together the information from class and from the book.
2. When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly.
3. I'm certain I can understand the ideas taught in this class.
4. I ask myself questions to make sure I know the material I have been studying.
5. Even when study materials are dull and uninteresting, I keep working until I finish.

By answering the questions in the *Stop & Think*, you have just responded to five items from the Motivated Strategies for Learning Questionnaire (MSLQ) (Midgley et al., 1998; Pintrich & De Groot, 1990). This questionnaire has been used in hundreds of studies to assess students' self-regulated learning and motivation. How did you do? The first two questions assess your use of *cognitive strategies*, like those we discussed in Cluster 9. The third question assesses your *sense of efficacy* for this class. But the last two questions (4 and 5) assess specific *self-regulation strategies* involved in studying.

Self-regulated learners transform their mental abilities, whatever they are, into academic skills and strategies. Students who are better at regulating their thoughts, feelings, motivation, and behavior in school tend to perform better academically (Dent & Koenka, 2016). In middle school and high school, strategy use and studying are central skills for academic success. In earlier grade levels, self-regulation of attention and emotion are particularly important for learning and achieving in school. In fact, regardless of their developmental level, students need to be able to understand the tasks they face, plan ahead for how they will perform those tasks, monitor their progress, and adjust their strategies as needed along the way.

How Does Self-Regulation Develop?

The concept of self-regulated learning integrates much of what is known about effective learning and motivation. Three major factors influence the development of skill and will: knowledge, motivation, and self-discipline or volition. As children grow, so does their repertoire of self-regulatory skills and their ability to deploy those skills in different circumstances.

KNOWLEDGE. To be self-regulated learners, students need knowledge about themselves, the subject, the task, strategies for learning, and the contexts in which they will apply their learning. "Expert" students know about themselves and can reflect on their own learning processes. This "metacognitive knowledge" (remember that *metacognition* refers to thinking about your own thinking) includes knowing your optimal learning approaches, what is easy and what is hard about learning certain material, coping strategies for handling difficult material, your interests and talents, and how to use your strengths (Efklides, 2011). Experts also know quite a bit about the subject being studied, and they can adapt their knowledge to meet new demands; the more they know, the easier it is to learn more (Alexander et al., 2009). They are more likely to understand that different learning tasks require different approaches and effort on their part. A simple memory task, for example, might require a mnemonic strategy (see Cluster 8), whereas a complex comprehension task might be approached through more effortful practices like concept maps of the key ideas or frequent self-quizzing

(Carpenter et al., 2020; see Cluster 9). Also, these self-regulated learners know that learning is often difficult and knowledge is seldom absolute; there usually are different ways of looking at problems as well as different solutions (Greene et al., 2010; Winne, 2017).

These expert students not only know what each task requires but also can apply the strategy needed. They can skim or read carefully. They can use memory strategies or reorganize the material. As they become more knowledgeable in a field, they apply many of these strategies automatically. In short, they have mastered a large, flexible repertoire of learning, help-seeking, and coping strategies (see Cluster 9). Finally, self-regulated learners think about the contexts in which they will apply their knowledge—when and where they will use their learning—so they can set motivating goals and connect their present efforts to their accomplishments (Winne, 2017). Clearly, helping students develop both content knowledge and self-knowledge will be important for helping students become self-regulated. Later in the cluster, we consider some suggestions for how to do this.

MOTIVATION. Knowing about what is needed to accomplish your learning goals is important, but it may not be sufficient. Motivation also influences the degree to which students regulate their own learning. In Cluster 12, you will learn about many facets of motivation, but let's consider a few that researchers have found to be related to self-regulated learning. Students who demonstrate greater individual interest in an activity tend to be better at regulating themselves in that activity (Renninger & Hidi, 2016; Thoman et al., 2017). My neighbor, a 10-year-old basketball enthusiast, can spend hours shooting hoops in her driveway, drawing elaborate defense plans for her team, and studying the moves of her role models. Activities that are valued, whether for their utility in getting us to the next level or simply for the enjoyment they bring, can lead us to deeper and more systematic engagement (Eccles et al., 2015). Motivational beliefs also influence self-regulation. For example, students who have higher self-efficacy for managing their learning tasks (i.e., self-efficacy for self-regulation) not only use more effective self-regulatory strategies but also perform better in school (Usher & Schunk, 2018). In addition, they believe their own intelligence and abilities are improvable (Job et al., 2015). Even if they are not intrinsically motivated by a particular task, they are serious about getting the intended benefit from it. Those who believe in their capabilities are better able to focus their attention and other cognitive and emotional resources for the task at hand. They know why they are studying, so their actions and choices feel more self-determined and less controlled by others (Zimmerman, 2011). Effective self-regulation also includes understanding how to motivate yourself and stay motivated during all phases of a task, a process called metamotivation (Sansone et al., 2019; Scholer et al., 2018). But knowledge and motivation are not always enough. Self-regulated learners need volition or self-discipline. As Lyn Corno once said, "Where motivation denotes commitment, volition denotes follow-through" (Corno, 1992, p. 72).

VOLITION. I am one month behind in this project (this is Ellen writing). I have been up writing at 5:00 a.m. every day. Some days I start the day distracted with other tasks or barely awake, but I want to keep writing because the deadline for this cluster is very near (well, passed actually). I have knowledge and motivation, but to keep going I need a good dose of volition. **Volition** is an old-fashioned word for willpower. In more technical terms, volition involves an internally driven, intentional decision to act on behalf of valued goals (Haggard, 2019). Typically, students need volition to overcome the resistance they feel when they experience a conflict between two desired outcomes (Oettingen et al., 2015). For example, you might need an act of volition to decide between hanging out with friends or doing some reading that is required for a paper due in a few weeks. In this way, an act of volition is *voluntary*, that is, a *free will* behavior. This makes volitional acts distinct from acts that are automatic or habitual.

Volition
Willpower; an internally-driven, intentional decision to reach valued goals by applying self-regulated learning.

Almost all students (and teachers!) have experienced the conflict that arises when short-term non-academic goals seem more appealing than long-term academic goals. For example, when over 1,000 middle and high school students were asked to describe such dilemmas,

they mentioned the tension between meeting academic requirements and watching Netflix, socializing with friends, giving in to their emotions, or just daydreaming (Duckworth et al., 2016). What helps people act volitionally in the service of longer-term, valued goals? For one thing, people need to feel a sense of control over the tasks they face (Efklides, 2011). Experience sticking with tasks to reach goals helps people understand their own active agency in achieving success (Metcalfe & Greene, 2007). I can stick with this writing because I have done similar writing before and held the finished product in my hands. Self-regulated learners know how to protect themselves from distractions—by choosing situations that are more conducive to studying, for example, so they are not interrupted (Duckworth et al., 2019). And they know what to do when they are tempted to stop working and have (another) cup of coffee—the temptation I'm facing now—that, and a beautiful day that beckons me to go out and work in the yard. (Yard work always looks appealing when I face a tough writing job—doing laundry is a close second.)

Volition is deliberate and effortful, but with practice it can become more automatic—a habit or a "work ethic" (Corno, 2011). William James knew this over 100 years ago. He told teachers that acts of will (i.e., voluntary attention and intentional decision making) make up a sliver of our daily lives and that habits make up most of what we do. Therefore, James urged teachers to seize every opportunity to help their students choose well, even if those choices were difficult. What is a volitional choice today, James said, becomes a habit tomorrow. A newly developed habit then serves as a "'shortcut' self-control strategy" (Fiorella, 2020, p. 607). A longitudinal study of first- through sixth-grade students showed that students whose work habits increased the most during middle childhood had higher high school achievement (Simpkins et al., 2020). The work habits children developed early in school were positively related to their educational attainment at age 26!

You may have heard of two concepts related to volition: self-control and grit. Both concepts have received growing attention in recent years. *Self-control* has been defined as "the ability to alter cognition, emotion, impulsive tendencies, and behaviors in the service of social norms, personal standards, and goals" (Li et al., 2021, p. 74). Walter Mischel's famous delay of gratification experiment in the late 1980s provides a glimpse into the importance of self-control (Mischel, 2014). He offered 4-year-old children an enticing marshmallow to eat and promised to give a second marshmallow to those who could postpone eating the first marshmallow until he returned from a 15-minute errand. (That's a long time!) Most children gobbled up the first marshmallow before he returned, but others waited, employing various self-control strategies to help them resist the temptation. (You can view this experiment online in several funny YouTube videos.) Mischel and his colleagues then conducted follow-up studies with these children over a period of many years. They were shocked at what they found. Children who had exercised self-control by waiting for the second marshmallow had higher SAT scores, responded better to stress, had fewer health problems, possessed better social skills, and enjoyed a host of other benefits. Mischel's study has been replicated with a more diverse sample of students, and the outcomes have been quite similar (Falk et al., 2020; Watts et al., 2018). Does this mean that some people are just naturally good at self-control and others are not? No, not exactly. Although some children are predisposed for greater self-control, environmental factors also affect children's ability to exercise self-control. Everyone can learn new self-control strategies, and those with more strategies perform better in school (Duckworth et al., 2014, 2019).

Volition is not always a momentary affair. Sometimes it takes years to accomplish a long-term goal (college degree, anyone?). What does it take to stay committed for the long haul? Researchers have recently claimed that it takes true **grit**—a personality trait characterized by "perseverance and passion to pursue long-term goals" (Duckworth et al., 2007, p. 1087). Angela Duckworth and her colleagues claim that students with more grit do better in school and in life (Duckworth, 2016; Duckworth et al., 2007). Over the past decade, grit has become quite a buzzword in education circles. Recent conferences and publications targeting K–12 and higher education personnel have paid a great deal of attention to the subject. Is grit really an important determinant of student success? The *Point/Counterpoint* looks at the evidence from diverse psychological perspectives.

Grit

A personality trait characterized by passion and persistence to meet long-term goals.

POINT/COUNTERPOINT: Are "Grittier" Students More Successful?

Most of us would agree that those who passionately persist toward their goals tend to meet with more success. Grit might be one important aspect of the volition component of self-regulation, but does it warrant all the attention it is receiving? Some education researchers have cast doubt on grit as a new phenomenon, citing mixed evidence of its relationship to success. These scholars emphasize that other self-regulatory factors are just as (if not more) important for determining student success. Let's look at these perspectives more closely.

Point

Grit is essential for student success, and teachers should therefore promote it. The jacket of Paul Tough's 2012 best-selling book *How Children Succeed* begins with the age-old question "Why do some children succeed while others fail?" His answer is in his subtitle: *Grit, Curiosity, and the Hidden Power of Character*. Tough argues that success in school requires more than outstanding intellectual abilities and talent. To end up at the top of one's class requires not just talent but a repertoire of "soft" skills—sometimes called "noncognitive factors" (Farrington et al., 2012). For Tough, such skills may be the deciding factor in whether children can escape dire circumstances: "There is no antipoverty tool we can provide for disadvantaged young people that will be more valuable than the character strengths… [such as] conscientiousness, grit, resilience, perseverance, and optimism" (p. 189). Tough's claims lean on the work of psychologist and former school teacher Angela Duckworth, who similarly wondered whether factors other than IQ or talent—things like effort, determination, self-control, persistence, and what she named *grit*—might actually be just as important in predicting success.

To investigate this, Duckworth and her associates asked hundreds of young people to rate their grittiness by responding to items like "I finish whatever I begin," and "I am diligent" (see http://www.angeladuckworth.com). They found that students with higher grit scores also had higher SAT scores and grades (Duckworth et al., 2007; Duckworth & Quinn, 2009; Park et al., 2018). Grittier kids placed higher in the National Spelling Bee competition (Duckworth & Quinn, 2009). Chicago high school juniors with more grit were more likely to graduate on time (Eskreis-Winkler et al., 2014). These findings often held true even when ability measures (IQ, past GPA) were included as predictors. Even novice teachers' level of grit was found to predict their teaching effectiveness (Duckworth et al., 2009).

How can grit predict success better than one's previous success? Duckworth (2016) offers her theory: "When you consider individuals in identical circumstances, what each achieves depends on just two things, talent and effort… but effort factors into the calculations *twice*, not once" (p. 42). First, putting forth initial effort is necessary to build skills. Second, maintaining effort is needed to apply skills to be productive. In their respective 2016 books, Duckworth and Tough argued that even though grit is a personality trait, it can also be cultivated. Their books highlight stories from numerous paragons of grit and offer tips for how parents, teachers, and leaders can promote gritty individuals. Although both authors have cautioned readers that promoting students' grit may not be an easy fix, their books flew off the shelves. The two are frequently invited keynote speakers at meetings for school leaders across the United States. Clearly, grit has found a solid fan base among educators. But grit also has its fair share of critics.

Counterpoint

A focus on grit as the key to success is too narrow. Education policy makers and researchers have been wary about the phenomenon of grit as a key to success. Grit's popularity has spawned contentious commentary in media outlets such as *The Atlantic* ("The Limitations of Teaching 'Grit' in the Classroom," "Is Grit Overrated? The Downsides of Dogged, Single-Minded Persistence"), *The New York Times* ("Putting Grit in Its Place"), and *EdWeek* ("Is 'Grit' Racist?"). The debate has several prongs (for a summary, see Alfie Kohn's

2014 article in the *Washington Post* "Sometimes It's Better to Quit Than to Prove Your Grit"). First, some argue that to focus on grit, an individual-level variable, as the deciding factor in student success is to blame students for their own school (mis)fortunes and to let schools off the hook; this distracts from examining systemic inequalities that place a greater burden on some students than others (Gorski, 2016; Love, 2019). Furman University Professor Paul Thomas (2014) is among those who see the promotion of grit as veiled racism/classism:

> Part of the "grit" narrative includes the assumption that successful students and people (read "White") are successful *primarily* because they work hard; they earn their success. The flip side of this "grit" narrative is that unsuccessful students and people (read "African American" and "Latino/a") are unsuccessful because they simply do not try hard enough.

Second, many have noted that grit appears to be a rebranding of well-researched variables such as conscientiousness, willpower, persistence, and resilience (Rimfeld et al., 2016). In fact, researchers have found little empirical distinction between new measures of grit and established measures, such as conscientiousness (Ponnock et al., 2020). Although Duckworth and her associates have tried to draw distinctions among some of these ideas, such as between grit and self-control (Duckworth & Gross, 2014), researchers have found considerable overlap between students' responses to grit items and to other measures of self-regulation (Muenks et al., 2017). They question grit's uniqueness.

Third, regarding the link between grit and success, some evidence shows that this relationship is not as conclusive as Duckworth and colleagues' earlier work suggested. Marcus Credé and his colleagues (2017) examined reports from 66,807 students and found that in some academic settings, grit is unrelated to students' academic achievement. An investigation of Boston-area eighth-graders also revealed that grit was not significantly correlated with students' achievement in math or language arts (West et al., 2016). Furthermore, when researchers have considered grit alongside other variables hypothesized to predict student performance, grit loses its predictive power (Muenks et al., 2017; Steinmayr et al., 2018). For example, middle school students' math and reading self-efficacy, but not grit, predicted their school grades, standardized test scores, and teachers' ratings of their math and reading competence (Usher, Li, et al., 2019). Perhaps students are unlikely to persist at something unless they believe they can be successful.

Beware of Either/Or

The idea that success is within reach to anyone willing to show dedication and persistence strikes a powerful chord. Maybe most of us believe as William James (1907) did that "we are making use of only a small part of our possible mental and physical resources" (p. 3). We are intrigued by the hopeful idea that empowering (or debilitating) *psychological factors* can explain the different life outcomes of two people with similar ability. A quick look at Oscar-nominated films reveals our fascination—we pay money to hear and watch stories of dogged perseverance in the face of great odds. They inspire us to consider our own higher potential.

Ultimately, however, the research evidence does not support such a simple story. Social cognitive theory acknowledges that many factors, both internal and external to the individual, must be considered. Yes, self-regulation matters in how successful a learner will be. And a certain level of grit may be one important aspect of self-regulation. But a one-variable approach is insufficient—appealing as it might be. Focusing too much on grit might lead educators to overlook other problems that affect students' self-regulation. As this cluster explains, to be self-regulated requires the engagement of cognitive, metacognitive, motivational, and volitional mechanisms, none of which casts the deciding vote on whether a student will ultimately succeed. In addition, we must consider the larger context in which learning takes place. Is what we are asking students to do worth their perseverance and effort in the first place? Does grit come at the expense of other aspects of a quality and "successful" education—such as one's full humanity, physical and psychological health, compassion for others, autonomy, and lifelong curiosity (Love, 2019)? Once again, it's not as simple as either/or.

DEVELOPMENTAL CHANGES IN SELF-REGULATION. How do children develop the knowledge, motivation, and volition for optimal functioning? The social cognitive theory perspective emphasizes the interaction of personal factors (e.g., neurobiological development, personal beliefs, cognition), environmental/social factors (e.g., basic needs support, cognitive engagement from family, peers, teachers), and behavioral factors. For example, behavioral self-regulation develops rapidly during early childhood and the preschool years, but personal and environmental factors are related to this development. Being a girl, having better language skills, and having a mother with a higher education level are factors associated with earlier development of behavioral self-regulation among preschool-aged children (Greene et al., 2010; Montroy et al., 2016).

Self-regulation generally improves over time as learners' neurobiological systems grow and adapt, but environmental stressors and social isolation can thwart development (Blair & Raver, 2015). Even so, early school experiences can help students get back on track. During early and middle childhood, many self-regulation skills are learned through observation and emulation (White & DiBenedetto, 2018). As learners become competent in applying the skills, they begin to internalize modeled strategies and demonstrate greater levels of self-control. They can eventually engage in independent, adaptive self-regulation in new situations.

Self-regulation relies on cognitive development too, as explained in Clusters 4, 8, and 9. Three key executive functions that underlie successful self-regulation are inhibitory control (resisting impulsive urges), working memory (holding information in mind while performing other mental operations), and cognitive flexibility (seeing something from different perspectives). These executive functions are necessary for the self-regulation required to solve complex problems (Cole et al., 2019; Diamond, 2012). Evidence has shown that adolescents across the globe increase in their executive functioning skills and plateau toward their mid-20s. However, late adolescence is accompanied by a heightened period of sensation seeking and risk-taking, which may make it challenging for teens to make good decisions, as parents and teachers know well (Steinberg et al., 2018).

How can teachers and parents promote better executive functioning among learners of all ages? Adele Diamond and Daphne Ling (2016, 2019) reviewed results from 179 research studies that tested various interventions. The studies showed that executive functions are impaired under conditions of stress, poor health, or emotional turmoil. Executive functions are enhanced when learners are relaxed and healthy and feel a greater sense of connectedness to others. Mindfulness practices with a movement component (e.g., tai chi) were most effective for improving students' executive functioning skills. School programs that emphasized the development of social and emotional competencies were helpful, too. Executive functions are also sharpened when activities are challenging and when frequent opportunities for sustained practice are provided (Diamond, 2012).

Co-regulation
A transitional phase during which students gradually appropriate self-regulated learning and skills through modeling, direct teaching, feedback, and coaching from teachers, parents, or peers.

Two social processes support the development of self-regulation: co-regulation and shared regulation. **Co-regulation** is a transitional phase during which students gradually appropriate and internalize self-regulated learning skills through modeling, direct teaching, feedback, and coaching from teachers, parents, or peers. **Shared regulation** occurs when students and teachers work together to regulate each other through reminders, prompts, and other guidance (Hadwin et al., 2018).

Shared regulation
Students and teachers working together to regulate each other through reminders, prompts, and other guidance.

Now that you have learned about the components of self-regulation and how it develops, let's examine a self-regulation model from the perspective of social cognitive theory. What does self-regulation in action look like?

A Social Cognitive Model of Self-Regulated Learning

Albert Bandura may have gone from high school graduate to professor at Stanford in six years using his self-regulated learning knowledge and skills, but not all of your students will have the ability to be Banduras with established *habits of cognition, motivation, and volition*. In fact, many will be like Tracy, a high school student described here by self-regulation expert Barry Zimmerman:

> An important mid-term math exam is two weeks away, and [Tracy] had begun to study while listening to popular music "to relax her." Tracy has not set any study

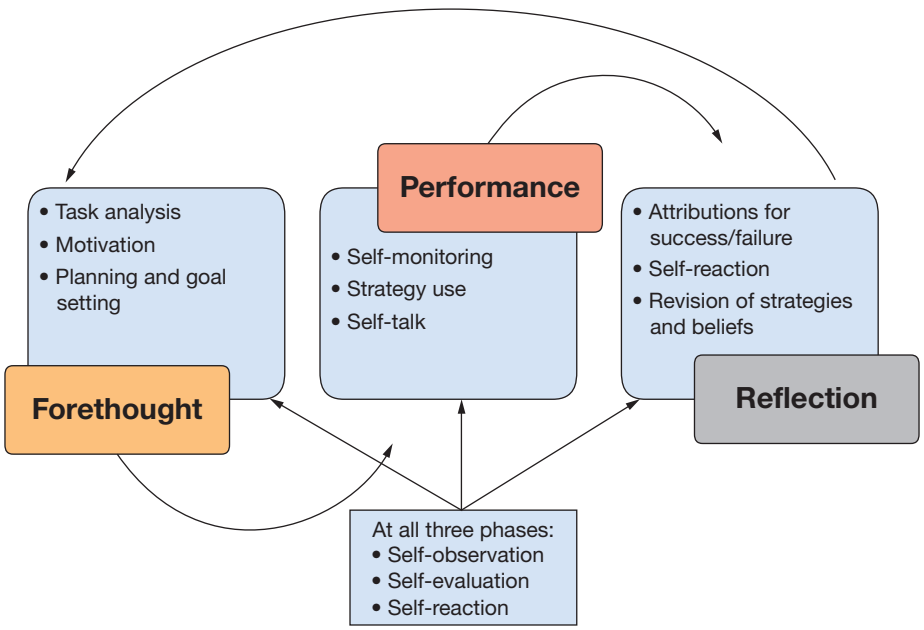
goals for herself—instead she simply tells herself to do as well as she can on the test. She uses no specific learning strategies for condensing and memorizing important material and does not plan out her study time, so she ends up cramming for a few hours before the test. She has only vague self-evaluative standards and cannot gauge her academic preparation accurately. Tracy attributes her learning difficulties to an inherent lack of mathematical ability and is very defensive about her poor study methods. However, she does not ask for help from others because she is afraid of "looking stupid," or seek out supplementary materials from the library because she "already has too much to learn." She finds studying to be anxiety-provoking, has little self-confidence in achieving success, and sees little intrinsic value in acquiring mathematical skill. (Zimmerman, 2002, p. 64)

Clearly, Tracy is unlikely to do well on the test. What would help? For an answer, let's consider Zimmerman's (2013) model of self-regulated learning shown in Figure 11.2. According to Zimmerman, self-regulation involves a three-phase cycle—*forethought, performance*, and *reflection*. In Phase 1, the *forethought phase*, Tracy needs to set clear, reasonable goals and plan a few strategies for accomplishing those goals. And Tracy's motivational beliefs make a difference at this point, too. If Tracy had a high self-efficacy for applying the strategies that she planned, if she believed that using those strategies would lead to math learning and success on the test, if she saw some connections between her own interests and the math learning, and if she were trying to master the material—not just look good or avoid looking bad—then she would be on the road to self-regulated learning (Usher & Schunk, 2018).

After thinking about the task at hand, Tracy moves into Phase 2—the *performance phase*. Performing brings new challenges. Now Tracy must have a repertoire of self-control (volitional) and learning strategies. She might use imagery, mnemonics, attention focusing, and other techniques such as those described in Clusters 8 and 9 to remain engaged (Duckworth et al., 2014). She also will need to self-observe—monitor how things are going—so she can change strategies if needed. Actual recording of time spent, problems solved, or pages written may provide clues about when or how to make the best use of study time. Turning off the music might help, too.

Finally, Tracy needs to move to Phase 3—the *reflection phase*—by looking back on her performance and reflecting on what happened. Here, her self-regulation involves an evaluation of her performance (Panadero et al., 2017). What worked and what didn't? Why?

Figure 11.2 Zimmerman's Three-Phase Model of Self-Regulated Learning



If she attributes successes to effort and good strategy use and avoids self-defeating actions and beliefs, she might increase her self-efficacy for doing a similar task in the future. She might also revise her goals for next time or give herself a reward for a job well done. If, on the other hand, Tracy reflects on her own weak efforts, she might pretend to not care or assume she is "no good at math."

Each phase in Zimmerman's model flows into the next, and the cycle continues as students encounter new learning challenges. You might recall that the capacity for *self-influence* is a hallmark of social cognitive theory (Bandura, 2018). At all phases of the self-regulatory cycle, learners must observe and evaluate themselves. Most of the time, learners' self-regulation depends on their own self-set or internalized standards. "If adequate self-standards are lacking, people exercise little self-directedness" (Bandura, 1986, p. 363). Part of your role as a teacher is helping learners internalize reasonable standards that will help them become good self-regulators.

We have looked at just one theoretical model of self-regulated learning. There are actually several models of self-regulated learning, but all agree that the cognitive processes needed for self-regulated learning require effort (see Panadero, 2017, for a review of six models). Let's now look at two classroom examples.

Reaching Every Student: Technology and Self-Regulation

In Cluster 10, we saw some examples of how technology-rich environments permit students to engage more interactively as they explore complex concepts. Over the past decade, and particularly during the COVID-19 pandemic, many schools have turned to technology-mediated instruction through remote learning, one-to-one laptop initiatives, online course offerings, and hybrid teaching approaches (Zheng et al., 2016). Well-designed, technology-enhanced resources can also benefit students with disabilities. What are the skills needed for meaningful learning to take place in these environments?

Without a doubt, students need metacognitive and self-regulatory skills so they won't get lost in a sea of information—and potential distraction. They need to actively evaluate the credibility and trustworthiness of information they find online. They also need motivation to stay focused in cognitively demanding, and often socially isolated, online worlds (Mayer, 2014). When the concepts students are learning are challenging and complicated, the presentation of scaffolds and prompts in the online learning context can enhance students' self-regulation (Azevedo et al., 2018; Moos, 2018). Including learning supports to reduce the cognitive burden on students' processing is especially important for supporting self-regulated learning in technology-rich environments (see Universal Design for Learning guidelines at https://udlguidelines.cast.org and in Cluster 14).

Does too much technology impair students' self-regulation? This probably depends on which technologies are being used and which aspects of self-regulation are important. For example, researchers have been curious about whether taking notes by typing is better or worse for students' learning than taking notes by handwriting them. One study found that students who used laptops to take notes *wrote more* but *performed worse* on a subsequent exam than students who took notes by hand (Mueller & Oppenheimer, 2014). When some students were asked to respond to phone text messages while taking notes for class, they performed even worse (Flanigan & Titsworth, 2020). This is why I turned my phone face-down while writing this cluster! Having to monitor multiple technological devices comes at a price—divided attention and more shallow engagement with content. Even being in close proximity to distracted people can disrupt the self-regulation process. When college students were sitting in a place where they could see peers who were multitasking on laptops, they performed worse on a test (Sana et al., 2013). Findings like these are among the reasons some teachers (even tech experts) have decided to place limits on their students' use of digital devices in the classroom (Shirky, 2014). Not only must students navigate the content-relevant information at their fingertips, they also frequently end up navigating their social relationships in the same digital spaces. (How many times have you checked your phone or social media since you began reading this cluster?)

How could you provide self-regulation teaching or coaching for your students who are learning with technology? How might you model successful self-regulated learning strategies for your students while using multimedia in your classroom or during remote instruction? These questions are becoming increasingly critical for today's teachers. As social cognitive theory would indicate, the digital environment can influence both the ways we think and how we behave.

Self-Regulation of Emotions

School days can be filled with all kinds of emotions—some are helpful for learning, but some are not. Emotion regulation is critical for academic and personal development (Weissberg et al., 2015). Individuals who effectively interpret emotions (e.g., anxiety, anger, frustration, excitement) in themselves and others, identify goals that incorporate those emotional signals, and eventually regulate emotion and behavior in ways that maximize successful engagement in social situations are characterized as having high *emotional intelligence*, a concept you learned about in Cluster 5. Higher emotional intelligence leads to greater well-being and academic performance (Cassady & Boseck, 2008; MacCann et al., 2020). Undergirding emotional intelligence is the ability to effectively regulate one's emotions. Let's take a closer look at the importance of emotion regulation in both learning and teaching.

SOCIAL AND EMOTIONAL LEARNING. Students need effective coping strategies to address the social and emotional aspects of a learning situation so that their emotional response becomes an asset, and not a barrier, to successfully achieving educational goals. These coping strategies rely on a broad range of skills. You learned about some of the core social and emotional skills and competencies involved in learning in Table 4.2 (back in Cluster 4). Those include self-awareness, self-management, social awareness, relationship skills, and responsible decision making (http://www.casel.org).

Over the past decade, numerous school-based programs have been launched to help teachers and students cultivate skills for regulating their social and emotional environments. Learners who take part in school-based programs designed to help them develop better emotion regulation skills, prosocial behaviors, and social competence have greater mental health, positive social adjustment, and academic achievement in the short and long term (Domitrovich et al., 2017; Jones et al., 2019). Researchers at the Harvard Graduate School of Education have created a useful tool that compares the social emotional learning features of a variety of programs: http://exploresel.gse.harvard.edu/compare-frameworks. This tool can help you understand how different programs support the social and emotional self-regulation skills described previously and elsewhere in this cluster.

Developing competence in social and emotional self-regulation is especially important at pivotal moments in brain development, such as during the early years, when students are learning how to learn in schools (Immordino-Yang et al., 2019). During the preschool years, emotion regulation becomes more integrated with structured learning. For example, Carlos Valiente and his colleagues (2010) followed almost 300 students through kindergarten to assess the relations between effortful self-control, emotionality, and academic achievement. They found that students' anger, sadness, and shyness were negatively related to achievement and that self-control was positively related to achievement, particularly for students who showed lower levels of negative emotions.

Another key period of development occurs during adolescence, when learners experience increased sensitivity to social cues and their changing bodies. Negative emotions, such as anxiety, shame, or guilt, can undermine learners' attention and motivation (Ben-Eliyahu, 2019). Ruminating over negative experiences requires great cognitive and emotional energy, which distracts from academic learning. Clearly, helping students develop emotional self-regulation skills can set them on a good path for learning in school, increase their resilience, and support healthy relationships with their peers. After all, emotional, behavioral,

and cognitive self-regulation are nearly always intertwined. Difficulties in one area usually mean difficulties in another. The good news is that social and emotional competencies are malleable—they can be taught (Schonert-Reichl, 2019). How can teachers help their students better regulate their social and emotional lives?

One primary way, says Daniel Goleman (2015), is by setting an example. "The teacher (and entire school staff, for that matter) ideally would model emotional and social competence for students" (p. 594). This is likely why many successful social and emotional learning programs are designed to work with teachers' emotion regulation skills first. As Kimberly Schonert-Reichl (2017) noted, "Stress in the classroom is contagious—simply put, stressed-out teachers tend to have stressed-out students" (p. 137). Teachers therefore need to receive emotional and social regulation instruction as part of their own training because they are key influencers in their students' academic and social environment (Valiente et al., 2020).

Although some colleges of education still offer little in the way of social-emotional training, several outstanding programs have been designed to equip teachers with skills to help themselves and their students become better at regulating emotions. For example, the RULER program (Recognizing, Understanding, Labeling, Expressing, and Regulating emotions) aims first to help adults build their own emotional intelligence so that they can model emotion regulation skills and cultivate a supportive environment for their students (see a review of this and other programs by Jones et al., 2017). Fifth- and sixth-grade teachers who used the RULER approach had higher levels of connection and warmth with their students and were more supportive of student autonomy, a key factor related to motivation, as you will learn in Cluster 12 (Rivers et al., 2013).

Another way to support students' emotion regulation is through a teaching approach that is culturally inclusive and sustaining, as you learned about in Clusters 2 and 3 (Jagers et al., 2019). Relationships built on trust and respect help students activate positive emotions and down-regulate negative ones (more about this in Cluster 13). Opportunities for students to take part in culturally supportive communities (e.g., Black student union, LGBTQ+ alliances) can increase students' feelings of safety and well-being while providing social and emotional support. Such programs may be particularly important during adolescence, as young people grapple with who they are as individuals and members of distinct social groups. Designing lessons that expose learners to diverse viewpoints and experiences also broadens learners' understanding and empathy for each other and for people who may not be represented in your classroom. Above all, it is important to remember that well-intentioned social and emotional learning approaches that do not challenge interpersonal and structural inequalities are not serving their purpose. As Dena Simmons (2021) pointed out, an approach that fosters social and emotional well-being involves "taking a stand against the injustices we witness in our districts, schools, and classrooms [and] creating space for processing the collective traumas of the pandemic, racism, and other forms of oppression in our school communities."

The *Guidelines: Encouraging Emotional Self-Regulation* on the next page give some ideas of practices that promote emotion regulation.

TEACHER STRESS AND SELF-REGULATION. We mentioned that teachers are instrumental socializing agents for students' emotion regulation, but they also need strategies for managing job-related stress. In the first years of teaching, high levels of stress lead to "burnout" for teachers who are not able to develop effective coping strategies to handle the many pressures that they face (Chang, 2009). The most commonly reported sources of teacher stress are student misbehaviors, interpersonal challenges, and work-related pressure—such as meeting personal or externally imposed standards (Cano-Garcia et al., 2005; Griffith et al., 1999). The COVID-19 pandemic multiplied the stressors that many teachers face, particularly when they had to carry out duties remotely and then adapt instruction to meet the needs of both in-person and remote learners. Many teachers returning to work faced considerable risks to their own health and the health of their families.

GUIDELINES

Encouraging Emotional Self-Regulation

Create a climate of trust in your classroom.

Examples

1. Avoid listening to "tattletale" stories about students.
2. Follow through with fair consequences.
3. Avoid unnecessary comparisons, and give students opportunities to improve their work.

Help students recognize and express their feelings.

Examples

1. Provide a vocabulary of emotions, and note descriptions of emotions in characters or stories.
2. Be clear and descriptive about your own emotions.
3. Encourage students to write in journals about their own feelings. Protect the privacy of these writings (see trust in the first part of the feature).

Help students recognize emotions in others, and develop empathy and compassion.

Examples

1. For young children, "Look at Chandra's face. How do you think she feels when you say those things?"
2. For older students, use readings, analysis of diverse characters in literature, films, or role reversals to help them identify the emotions of others.

Provide strategies for coping with emotions.

Examples

1. Discuss or practice alternatives such as stopping to think how the other person feels, seeking help, or leaving the scene.
2. Use centering practices such as self-talk, deep breathing, or mindful movement to diffuse or prevent emotional outbursts.
3. Model strategies for students. Talk about how you handle anger, disappointment, or anxiety.

Help students recognize cultural differences in how people express emotion.

Examples

1. Have students write about or discuss how they show emotions in their family.
2. Teach students to "check it out." Ask the other people how they are feeling.

For ideas about promoting emotional competence, see http://casel.org.

Teachers who are most effective at handling stressors in the classroom demonstrate both the high levels of teaching self-efficacy discussed earlier and a positive level of emotional self-regulation (Kim et al., 2019; Schonert-Reichl et al., 2017). Teachers are more likely to maintain a healthy professional life if they can manage professional stressors such as student disruptions and pressures from parents without becoming emotionally charged, keep things in perspective, and seek support from their peers (Collie et al., 2012; Jennings & Frank, 2015; Woolfolk Hoy, 2013). When teachers feel supported by their administrators, they report feeling less stress. For example, teachers who felt that their school leaders gave them autonomy in their work reported greater emotional "buoyancy"—that is, they felt more able to manage their stress (Collie, 2021). By contrast, when teachers felt pressured or controlled or that their autonomy was thwarted by restrictive policies, they reported feeling emotionally exhausted.

Several approaches have been found to help reduce teachers' stress. One promising practice is mindfulness training, which helps teachers focus attention and emotional resources on the present situation without judgment, recognizing and releasing unnecessary

expectations and biases, and developing greater compassion for self and others (Roeser et al., 2013). Another approach, the Cultivating Awareness and Resilience in Education (CARE) program, provides mindfulness-based professional development to K–12 educators. Teachers who were randomly assigned to receive the CARE training, which features emotional skill development, mindfulness-based stress reduction, and compassion training, showed significant gains in well-being, self-efficacy, and mindfulness, along with reduced burnout compared with teachers assigned to a control group (Jennings et al., 2013, 2017). The program also led to better emotional support of students. A meta-analysis of similar studies showed that engagement in mindfulness practices was associated with decreases in teacher stress, anxiety, depression, and burnout (Zarate et al., 2019).

Teaching Toward Self-Efficacy and Self-Regulated Learning

We have considered the important role that self-efficacy and self-regulation play in a social cognitive view of teaching and learning. How might these ideas be applied in your classroom?

Stop & Think How are you studying right now? What goals have you set for your reading today? What is your plan for learning, and what strategies are you using right now to learn? How did you learn those strategies?

Fortunately, a growing body of research offers guidance about how to design tasks and structure classroom interactions to support students' development of and engagement in self-regulated learning (Brown et al., 2014; Diamond & Ling, 2016; Duckworth et al., 2018; Perry, 1998; Stoeger & Ziegler, 2011; see Schunk & Greene, 2017). This research indicates that students develop academically effective forms of self-regulated learning and a sense of efficacy for learning when teachers involve them in *complex, meaningful tasks* that extend over *long periods of time*, much like the constructivist activities described in Cluster 10. Also, to develop self-regulated learning and self-efficacy for learning, students need to have some *control or agency over their learning processes and products*; they need to make choices about what to work on, where, and with whom. They also need to have some control over the difficulty of the task—how much to read or write, at what pace, and with what level of support. And, because *self-management* and *self-evaluation* are key to effective self-regulated learning and a sense of efficacy, teachers can help students develop self-regulated learning by involving them in setting criteria for evaluating their learning processes and products and then giving them opportunities to reflect on and make judgments about their progress using those standards. It helps to work in *collaboration* with peers and seek feedback from them. As you saw earlier, this has been called shared regulation. Throughout the entire process, teachers must co-regulate the task by "providing just enough and just in time information and support to facilitate students' acquisition and application of" self-regulated learning (Perry & Rahim, 2011, p. 130). Let's examine each of these research-based ways to support the development of self-efficacy and self-regulation.

Complex Tasks

Inviting students to engage in complex, meaningful tasks that are properly scaffolded can help them develop self-regulatory skills and a sense of efficacy for long-term goals. The term *complex* refers to the design of tasks, not their level of difficulty. Teachers don't want to assign students tasks that are too difficult and that lead to frustration. This is especially true when students have learning difficulties. In fact, research indicates that the most motivating and academically beneficial tasks for students are those that challenge but don't overwhelm them (Eitel et al., 2020; Mayer, 2014). Remember what you learned in Cluster 8 about extraneous cognitive load.

From a design point of view, tasks are complex when they address multiple goals and involve large chunks of meaning—for example, projects and thematic units. Furthermore, complex tasks extend over long periods of time, engage students in a variety of cognitive and metacognitive processes, and allow for the production of a wide range of products (Perry et al., 2002). For example, a study of Egyptian pyramids might result in the production of written reports, maps, diagrams, skits, models, and even an Egyptian "museum."

Even more important, complex tasks provide students with information about their learning progress. These tasks require them to engage in deep, elaborative thinking, planning, and problem solving. In the process, students develop and refine their cognitive and metacognitive strategies. Furthermore, succeeding at such tasks increases students' self-efficacy and intrinsic motivation (McCaslin & Good, 1996; Turner, 1997). Such projects often afford learners opportunities to cope with stressful situations, regulate emotions, and make adaptations to accomplish their goals (Matthews et al., 2002).

Agency and Control

Teachers are in a prime position to help students develop a sense of their own agency. When students have choices (e.g., about what to produce, how to produce it, where to work, with whom to work), they are more likely to anticipate a successful outcome (increased self-efficacy) and consequently increase effort and persist when difficulties arise (Turner & Paris, 1995). Also, by involving students in making decisions, teachers invite them to take responsibility for learning by planning, setting goals, monitoring progress, and evaluating outcomes (Turner, 1997). Finally, when students perceive they have control over their learning activities, they maintain higher levels of motivation to complete the task, as predicted by numerous theories of motivation presented in Cluster 12 (Ryan & Deci, 2017). These are qualities of highly effective, self-regulating learners. Remember from Cluster 5 that, according to Sternberg (2004), one aspect of intelligence is choosing or adapting environments so that you can succeed. Bandura (2016) would agree—one way to be an agent is to select environments that work best for you by exercising self-control.

Giving students choices creates opportunities for them to adjust the level of challenge that particular tasks present (e.g., they can choose easy or more challenging reading materials, determine the nature and amount of writing in a report, supplement writing with other expressions of learning). But what if students make poor academic choices? Highly effective teachers who are high in self-regulated learning carefully consider the choices they give to students. They make sure students have the knowledge and skills they need to operate independently and make good decisions (Perry & Rahim, 2011). For example, when students are learning new skills or routines, teachers can offer choices with constraints (e.g., students must write a minimum of four sentences/paragraphs/pages, but they can choose to write more; they must demonstrate their understanding of an animal's habitat, food, and babies, but they can write, draw, or speak their knowledge).

Highly effective teachers also teach and model good decision making. For example, when students are choosing partners, teachers can ask them to consider what they need from their partner (e.g., shared interest and commitment, perhaps knowledge or skills that they need to develop). When students are making choices about how best to use their time, these teachers ask, "What can you do when you're finished? What can you do if you are waiting for my help?" Often, lists are generated and posted so students can refer to them while they work. Finally, highly effective teachers give students feedback about the choices they make and tailor the choices they give to suit the unique characteristics of particular learners. For example, they might encourage some students to select research topics for which resources are readily available and written at a level that is accessible to the learner. Alternatively, they might encourage some students to work collaboratively versus independently to ensure they have the support and shared regulation they need to be successful. It takes some practice to determine the extent to which scaffolds are needed to support learner agency and self-regulation (Vaughn, 2018).

Participatory communities—those in which learners have leadership and voice—also provide support for student agency. For example, youth participatory action research or opportunities for project-based learning can enhance a sense of personal and shared responsibility, both of which support self-regulation. When such projects are undertaken in the service of larger social or cultural goals, they become more personally and/or collectively valued (Jagers et al., 2019). Experimental evidence shows that when students are engaged with tasks that involve self-transcendent goals as opposed to self-focused goals, their academic self-regulation and motivation are enhanced (Yeager et al., 2014).

Self-Management

Much of being a successful self-regulator involves being a good self-manager. To be sure, some psychologists rely on the ideas of behaviorism for modifying personal behavior through the use of reinforcement and punishment. A social cognitive approach extends this. For instance, Donald Meichenbaum (1977) had success teaching students who were having difficulty controlling their behavior to "talk themselves through" tasks. Meichenbaum called his method *cognitive behavior modification*. You may remember from Cluster 3 that there is a stage in cognitive development when young children seem to guide themselves through a task using private speech (Vygotsky, 1987a). They talk to themselves, often repeating the words of a parent or teacher. In cognitive behavior modification, students are taught directly how to use this **self-instruction**.

Self-instruction
Talking oneself through the steps of a task.

Meichenbaum (1977) outlined the steps, which are similar to Bandura's (1986) description of vicarious learning and self-modeling:

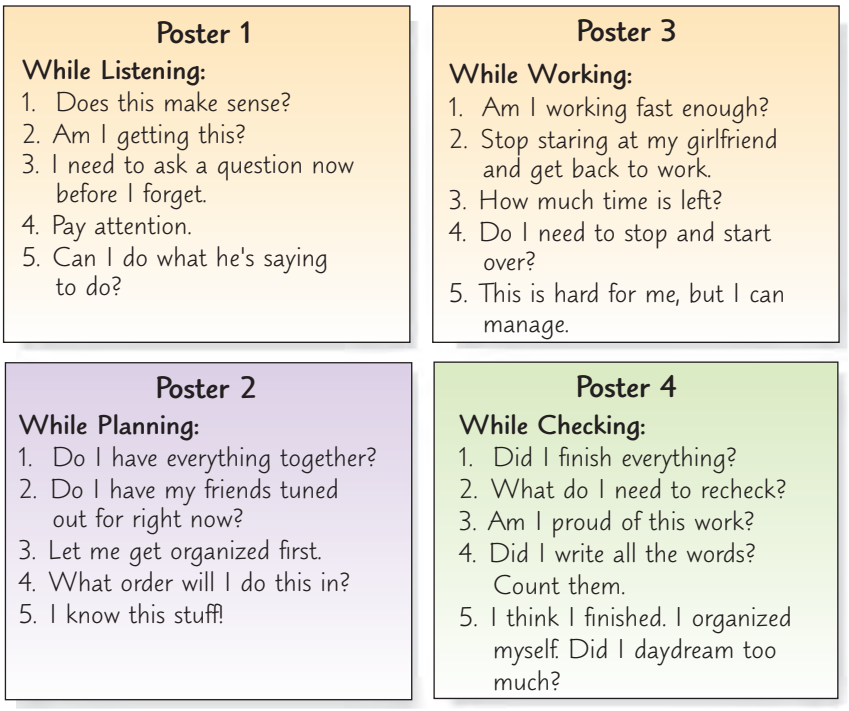
1. An adult model performs a task while talking through the steps out loud (cognitive modeling).
2. The child performs the same task under the direction of the model's instructions (overt, external guidance).
3. The child performs the task while self-instructing aloud (overt, self-guidance).
4. The child whispers the instructions aloud while going through the task (faded, overt self-guidance).
5. The child performs the task while guiding activities via private speech (covert self-instruction). (p. 32)

Students can engage in four self-management skills to increase their learning: listening, planning, working, and checking (Manning & Payne, 1996). How might cognitive self-instruction help students develop these skills? One possibility is to use personal booklets or class posters that prompt students to "talk to themselves" about these skills. For instance, one fifth-grade class designed a set of prompts for each of the four skills and posted the prompts around the classroom. The prompts for *listening* included "Does this make sense?" "Am I getting this?" "I need to ask a question now before I forget." "Pay attention!" "Can I do what he's saying to do?" *Planning* prompts were "Do I have everything together?" "Do I have my friends tuned out for right now?" "Let me get organized first." "What order will I do this in?" "I know this stuff!" Posters for these and the other two skills, *working* and *checking*, are shown in Figure 11.3. Part of the power of this process lies in getting students involved in thinking about and creating their own guides and prompts. Many active reading programs encourage students to ask, "What do good readers do?" and then use their answers as prompts. Having the discussion and posting the ideas makes students more self-aware and increases their sense of control over their own learning. Teachers can model self-directed talk for their students by "thinking aloud" during instruction (White, 2017).

Today, entire school intervention programs are based on similar types of cognitive behavior modification as a form of self-management, which is one of the core skills also needed for effective social and emotional regulation. For example, the Coping Power Program includes training for both parents and their children, beginning in the last half of one academic year and continuing through the entire next school year. The training for

Figure 11.3 **Posters to Remind Students to "Talk Themselves Through" Listening, Planning, Working, and Checking in School**

These four posters were designed by a fifth-grade class to help them remember to use self-instruction. Some of the reminders reflect the special world of these preadolescents.



Source: Manning, B. H. & Payne, B. D. *Self-talk for teachers and students: Metacognitive strategies for personal and classroom use,* © 1996. Reprinted by permission of Pearson Education, Inc.

students often focuses on emotion regulation skills, such as becoming aware of feelings (especially anger), learning to relax, redirecting the focus away from angry feelings, making coping self-statements, seeing the perspectives of others, developing social problem-solving skills, and dealing with peer pressure by practicing how to say no (Lochman & Wells, 2003). Another similar approach is Tools for Getting Along (Smith et al., 2016). Both programs have been effective in helping early adolescent students to "get along" with their classmates and teachers, particularly when they are upset or angry. In addition, in psychotherapy, tools based on cognitive behavior modification have proved to be some of the most effective ways of dealing with psychological problems such as depression.

Connect and Extend to PRAXIS II®

Self-Regulation (II, A1)

Take a look at the Merton Ethel Harris Research and Training Centre (https://self-reg.ca) for tips to help students develop the goals, metacognitive skills, and self-regulatory practices that can support a lifelong devotion to learning.

Self-Evaluation

Evaluation practices that support self-regulated learning are nonthreatening. They are embedded in ongoing activities, emphasize processes as well as products, focus on personal progress, and help students to interpret errors as opportunities for learning to occur. In these contexts, students enjoy and actually seek challenging tasks because the risk of participation—or perceived risk—is low (Paris & Ayres, 1994). Involving students in generating evaluation criteria and evaluating their own work also reduces the anxiety that often accompanies assessment by giving students a sense of control over the outcome. Students can judge their work in relation to a set of qualities both they and their teachers identify as "good" work. They can consider the effectiveness of their approaches to learning and alter their behaviors in ways that enhance it (Winne, 2011; Winne & Perry, 2000).

Classrooms that are high in self-regulated learning have both formal and informal opportunities for students to evaluate their learning. For example, one student teacher asked fourth- and fifth-grade students to submit reflection journals describing the games they

designed with a partner or a small group of collaborators for a probability and statistics unit (Perry et al., 2004). Their journals explained their contribution to the group's process and product and also described what they learned from participating. The student teacher took these reflections into account when she evaluated the games. More informally, teachers ask students, "What have you learned about yourself as a writer today?" "What do good researchers and writers do?" "What can we do that we couldn't do before?" Questions like these, posed to individuals or embedded in class discussions, prompt students' metacognition, motivation, and strategic action—the components of self-regulated learning (Panadero et al., 2017).

Collaboration

Teamwork can facilitate self- and co-regulation. The Committee on Increasing High School Students' Engagement and Motivation to Learn (2004) concluded that when students can put their heads together, they are more receptive to challenging assignments—the very kind of complex task that develops self-regulation. The most effective uses of cooperative/collaborative relationships to support self-regulated learning are those that reflect a climate of community and shared problem solving (Perry & Drummond, 2002; Perry et al., 2002). In these contexts, teachers and students actually co-regulate one another's learning and motivation, offering support, whether working alone, in pairs, or in small groups (McCaslin & Vriesema, 2018). This support is instrumental to individuals' development and use of metacognition, intrinsic motivation, and strategic action (e.g., sharing ideas, comparing strategies for solving problems, identifying everyone's area of expertise). Teachers who are skilled at supporting self-regulation spend time at the start of each school year teaching routines and establishing norms of participation (e.g., how to give constructive feedback, how to take turns and share tasks when working collaboratively, how to interpret and respond to peers' suggestions). As you will see in Cluster 13, developing useful management and learning procedures and routines takes time at the beginning of the year, but it is time well spent. Once routines and patterns of interaction are established, students can focus on learning together, and teachers can attend to teaching academic skills and the curriculum. Cluster 10 provides some additional suggestions for technology-mediated collaborations.

Bringing It All Together: Theories of Learning

How can we make sense of the diverse perspectives on learning we have explored for the last four clusters? We have considered behavioral, cognitive, constructivist (individual and social), and social cognitive explanations of what people learn and how they learn it. Table 11.3 on the next page presents a summary of these perspectives on learning.

Rather than debating the merits of each approach in Table 11.3, consider their contributions to understanding learning and improving teaching. Don't feel that you must choose the "best" approach—there is no such thing. Chemists, biologists, and nutritionists rely on different theories to explain and improve health. Different views of learning can be used together to create productive learning environments for the diverse students you will teach. Behavioral theory helps us understand the role of cues in setting the stage for behaviors and the role of consequences and practice in encouraging or discouraging particular behaviors. But much of humans' lives and learning is more than behaviors. Language and higher-order thinking require complex information processing and memory—something the cognitive models help us understand. And what about the person as a creator and constructor of knowledge, not just a processor of information? Here, constructivist perspectives have much to offer. Social cognitive theory illustrates the powerful learning opportunities afforded through modeling and observational learning and highlights the important roles of agency and self-direction. Finally, life requires self-regulation, and we have a lot

to regulate—our thoughts, bodies, behaviors, environments, relationships, emotions, and more. Promoting effective self-regulation skills promotes greater success in learning regardless of the operational process of learning.

We like to think of the four main learning theories in Table 11.3 as four pillars for teaching. Students must first understand and make sense of the material (constructivist); then they must remember what they have understood (cognitive—information processing); then they must practice and apply (behavioral) their new skills and understanding to make them more fluid and automatic—a permanent part of their repertoire. Finally, they must take charge of their own learning (social cognitive). Failure to attend to any part of the process results in lower-quality learning.

Table 11.3 Four Views of Learning

There are variations within each of these views of learning and overlaps as well, especially in constructivist views.

	BEHAVIORAL	COGNITIVE	CONSTRUCTIVIST		SOCIAL COGNITIVE
	APPLIED BEHAVIORAL ANALYSIS *B. F. SKINNER*	**INFORMATION PROCESSING** *J. ANDERSON*	**INDIVIDUAL** *JEAN PIAGET*	**SOCIAL/SITUATED** *LEV VYGOTSKY*	**SOCIAL COGNITIVE THEORY** *ALBERT BANDURA*
Knowledge	• Fixed body of knowledge to acquire • Stimulated from outside	• Fixed body of knowledge to acquire • Stimulated from outside • Prior knowledge influences how information is processed	• Changing body of knowledge, individually constructed in social world • Built on what learner brings	• Socially constructed knowledge • Built on what participants contribute, construct together	• Changing body of knowledge, constructed in interaction with others and the environment
Learning	• Acquisition of facts, skills, concepts • Occurs through drill, guided practice	• Acquisition of facts, skills, concepts, and strategies • Occurs through the effective application of strategies	• Active construction, restructuring prior knowledge • Occurs through multiple opportunities and diverse processes to connect to what is already known	• Collaborative construction of socially defined knowledge and values • Occurs through socially constructed opportunities	• Active construction of knowledge based on observation, interacting in the physical and social world, and developing agency—becoming more self-regulating
Teaching	• Transmission presentation (Telling)	• Transmission • Guide students toward more "accurate" and complete knowledge	• Challenge, guide thinking toward more complete understanding	• Co-construct knowledge with students	• Presenting models, demonstrating, supporting self-efficacy and self-regulation
Role of Teacher	• Manager, supervisor • Correct wrong answers	• Teach and model effective strategies • Correct misconceptions	• Facilitator, guide • Listen for student's current conceptions, ideas, thinking	• Facilitator, guide • Co-participant • Co-construct different interpretation of knowledge; listen to socially constructed conceptions	• Model, facilitator, motivator • Model of self-regulated learning
Role of Peers	• Not usually considered	• Not necessary but can influence information processing	• Not necessary but can stimulate thinking, raise questions	• Ordinary and necessary part of process of knowledge construction	• Serve as models • Ordinary and necessary part of process of knowledge construction
Role of Student	• Passive recipient of information • Active listener, direction-follower	• Active processor of information, strategy user • Organizer and reorganizer of information • Rememberer	• Active construction (within mind) • Active thinker, explainer, interpreter, questioner	• Active co-construction with others and self • Active thinker, explainer, interpreter, questioner • Active social participator	• Active co-construction with others and self • Active thinker, explainer, interpreter, questioner • Active social participator

Module 35 Summary

Self-Regulated Learning: Skill and Will (pp. 484–496)

What factors are involved in self-regulated learning? One important goal of teaching is to prepare students for lifelong learning. To reach this goal, students must be self-regulated learners; they must have a combination of the knowledge, motivation to learn, and volition that provides the skill and will to learn independently and effectively. Knowledge includes an understanding of self, subject, task, learning strategy, and contexts for application. Motivation to learn provides the commitment and includes self-beliefs and interest. Volition is the follow-through that stays the course despite distraction. Personality characteristics such as grit, conscientiousness, and self-control are important here.

What is the self-regulated learning cycle? Zimmerman's model of self-regulated learning notes three phases: *forethought* (which includes setting goals, making plans, self-efficacy, and motivation); *performance* (which involves self-control and self-monitoring); and *reflection* (which includes self-evaluation and adaptations, leading to the forethought/planning phase again).

What are some examples of teaching students to be more self-regulated? Self-regulated learners engage in four types of activities: analyzing the task, setting goals and designing plans, engaging in learning, and adjusting their approach to learning. Teaching students to be more self-regulated might take the form of providing opportunities to identify and analyze the task at hand. Students should ask themselves: What is the task? What is an ideal outcome of the task? Students may also benefit from goal-setting practice; they may ask: What are my short-term goals? What are my long-term goals? Learning strategies such as identifying important details and developing a big picture of material is the next step in the process. Finally, students need to reflect on whether they were successful and devise strategies for overcoming shortcomings in their self-regulation process. They may ask themselves: Where was I successful? Where do I need to improve in order to meet my goals in the future?

What are the skills involved in emotional self-regulation? Emotionally self-regulated individuals are aware of their own emotions and the feelings of others—realizing that inner emotions can differ from outward expressions. They can talk about and express emotions in ways that are appropriate for their cultural group. They can feel empathy for others in distress and also cope with their own distressing emotions—they can handle stress. Emotional self-regulators can also employ a variety of problem-solving and coping strategies to help them manage the personal and social emotional stimuli to promote optimal performance. Emotional self-regulation involves an understanding that relationships are defined in part by how emotions are communicated between people. All these skills come together to produce a capacity for emotional self-regulation, which is a central part of social and emotional learning. To effectively help students become better at social and emotional learning, teachers must also learn emotion regulation strategies that help mitigate their stress, such as mindfulness-based practices.

Teaching Toward Self-Efficacy and Self-Regulated Learning (pp. 496–500)

How can teachers support the development of self-efficacy and self-regulated learning? Teachers should involve students in complex, meaningful tasks that extend over long periods of time. Teachers should provide students control over their learning processes and products allowing them to make choices as agents. They can help students manage themselves by strategies like cognitive behavior modification and self-talk. Teachers should involve students in setting criteria for evaluating their learning processes and products and then give them opportunities to make judgments about their progress using those standards. Finally, teachers should encourage students to work collaboratively with and seek feedback from peers.

Bringing It All Together: Theories of Learning (pp. 500–501)

What is the value of the four different perspectives on learning? The behavioral, cognitive, constructivist, and social cognitive learning theories are four pillars for teaching. Students must first understand and make sense of the material (constructivist); then they must remember what they have understood (cognitive—information processing); then they must practice and apply (behavioral) their new skills and understanding to make them more fluid and automatic—a permanent part of their repertoire. Finally, they must take charge of their own learning (social cognitive). Failure to attend to any part of the process results in lower-quality learning.

Cluster 11 Review

Key Terms

Co-regulation
Direct reinforcement
Grit
Human agency
Mastery experiences
Modeling
Physiological or emotional arousal
Resilience
Ripple effect
Self-efficacy
Self-instruction
Self-regulated learning
Self-regulation
Self-reinforcement
Shared regulation
Social cognitive theory
Social learning theory
Social persuasion
Teachers' sense of efficacy
Triadic reciprocal causality
Vicarious experiences
Vicarious reinforcement
Volition

Connect and Extend to Licensure

Multiple-Choice Questions

1. "I believe I will do well in this class," Chris declared to her brother. "I received a perfect score on the verbal part of the SAT, and I have always excelled in my literature classes." Chris is demonstrating which of the following?

A. High self-esteem
B. High levels of empathy
C. High self-efficacy in English
D. Low self-efficacy in English

2. Modeling is defined as changes in behavior, thinking, or emotions that happen through observing another person. Which theory and theorist are associated with learning through observation?

A. Behaviorist theory, Skinner
B. Constructivist theory, Piaget
C. Social cognitive theory, Bandura
D. Sociocultural theory, Vygotsky

3. Miss Hutton turned around with a scowl on her face and addressed her second-graders. "What do you think you're doing, Johnny? Did I tell you to get out of your seat? Don't you ever let me catch you up without permission again." The class sat silently with their eyes wide. When the lunch bell rang an hour later, not one of the children dared to move from their seats. This is an example of which one of the following?

A. Self-regulation
B. Self-efficacy
C. Reciprocal causality
D. Vicarious learning

4. Through observational learning, one learns how to perform a behavior and also what will happen in specific situations if one performs it. Observation can be a very efficient learning process. What four elements must be met in order to learn from observation?

A. Attention, retention, production, and motivation/reinforcement
B. Attention, cognition, belief, and value
C. Observation, desire, developmental capability, and suitability
D. Observation, motivation, abstraction, and reinforcement

Constructed-Response Questions

Case

"Marcus! Look how well you did on your spelling test!" Mr. Bonner smiled at Marcus, who beamed in response. "I knew when we started to chart your progress you would really do well. You have had three perfect scores on the last three tests. It just goes to show, you studied every night for a few minutes, and your grade has gone up, up, up! I'm looking at the chart we made at the beginning of the year, and I think it really helped."

"Mr. Bonner, I would like to do the same thing in math. I think if I practice every night and chart my progress, I'll get perfect grades in math, too! I'll make a chart and pick out some math games I can play at home to improve."

5. How is Mr. Bonner encouraging Marcus's self-efficacy?

6. How is Marcus's response to Mr. Bonner an example of self-regulated learning?

What Would They Do?

Teachers' Casebook: Failure to Self-Regulate

At the beginning of this cluster, we asked you to think critically about how you would help your students develop organizational and self-regulation skills. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Kyle Brown • 3rd-Grade Teacher

Hjorth Road Elementary School, Surrey, British Columbia, Canada

In my primary classroom, building and maintaining supports that encourage student autonomy is crucial to help organize time and complete tasks in a productive way. In literacy, for example, we complete a process known as Story Workshop. To do this process well, we begin the year by developing collective understanding about stories and use this knowledge to co-construct criteria, which is posted in the room and helps students to gradually become more independent in completing the basic components of a story. Once we have established this foundation, students begin tailoring their work to different goals depending on where they are with their literacy development. Furthermore, embedded into this classroom practice are possibilities for choice in writing materials, representation (e.g., oral retelling, drawing) and work space (e.g., independently, with a friend, with a group, with a teacher). These options, together with supports such as the classroom rubric, which visually represents our foundational story writing criteria, help students to work at their own pace and take ownership over their final product.

Miriam Miller • English Language Learning Teacher Educator

University of British Columbia, Vancouver, British Columbia, Canada

As educators, we want our students to develop a wide range of skills to feel empowered in their learning, to know the steps involved in a task, plan and make intentional choices on how to engage in the task, and reflect and iterate on their learning so that they might be successful. These are the skills I want my students to have so they might regulate their learning. If faced with a similar situation, I might share my observation with the class that getting started on a task seems to be a challenge. I would invite the students to think about why that might be and, together, we would problem solve what we might do. I would facilitate the conversation to address the steps of what it takes to get started, to stay on task and work toward completion. As a result, we might generate a series of questions the students can ask of themselves when they are about to start some work (e.g., What is the task? What do I need to do to complete the task? What strategy will I use to do it? How is it going? What else should I try?). I would use the co-created questions (or steps) to create an anchor chart with visuals to support students. The next time we begin a learning activity as part of curricular exploration, we would review our anchor chart prior to starting and then refer to it as students experience a challenge (e.g., are students struggling because they don't know what the job is [task interpretation] or is it because they've started doing the job but aren't using an effective strategy to complete the task?). Students' efficacy develops when they co-create the steps in the learning process and are empowered to actively regulate their learning.

Nicole Macpherson • K–12th-Grade District Learning Support Consultant

Burnaby School District, British Columbia, Canada

Though there are many unique and wonderful classroom profiles, it is becoming increasingly common to see classrooms in which students have a lack of organizational skills to begin and/or execute projects. For this group, I will focus on establishing a classroom culture that values routines, expectations, and student voice. Each class will begin with a review of our "schedule"—upcoming social and academic activities. This review makes things predictable for my students and empowers them to anticipate [and] then take control of their learning, which leads to success that builds a sense of self-efficacy and confidence. I will use their interests as a platform to engage them in material and routines we do each day. For this class I would explicitly teach key executive functioning skills, such as organizing ideas and planning and prioritizing tasks, to build a foundation for teaching curricular content. Once my students have systematic ways to organize their thoughts it will set them up to pick out key information and weave in curricular content. I like to use these same strategies in most subject areas and emphasize their importance through modeling, graphic organizers, and having students create self-monitoring checklists for each activity or class. To continue to support the development of self-efficacy, I will offer my students choice, provide specific positive feedback, encourage goal setting and offer opportunities for self-evaluation to motivate them to monitor their own learning. Encouraging my students to routinely reflect about what they are doing, how they are doing, and managing their own emotions around their learning expectations is important to their ability to become self-regulated learners.

Jane W. Campbell • 2nd-Grade Teacher

John P. Faber Elementary School, Dunellen, NJ

To begin the year, I teach several routines that help students to become more independent and successful. First they are introduced to a homework folder labeled with the classroom number and school name. Ownership is important, so they

write their own names on the label, too. There are also designated sections for parent signatures, homework to be returned to school, and homework to be kept at home. Each day students put their things into the proper section. I check the students' success by walking through the room and looking at their folders. As different students become proficient, they become student helpers to help spot check other students as well. Organizing the students takes time, but once the routine is established, most students can successfully complete the task. As the routine is practiced and established, the students become successful and more self-reliant. Everyone is happy: the students, the parents, and the teacher.

Carla S. Higgins • K–5th Grade Literacy Coordinator
Legend Elementary School, Newark, OH

I don't make assumptions about my students' organizational skills. Instead, I explicitly teach them skills that work for our class and support future organization such as using a structured folder for class paperwork, frequent checkpoints, and an assignment calendar or agenda. I include students in planning due dates by considering what it would take to complete each assignment. For longer assignments, I ask students to help create a reasonable timeline for completing steps of the project and offer frequent checks for completion of the steps. Finally, since we live in a culture where technology drives much of our communication, I set up a website or email reminder system to provide additional support for students and to communicate with parents to keep them involved.

Marie Hoffman Hurt • 8th-Grade Foreign-Language (German and French) Teacher
Pickerington Local Schools, Pickerington, OH

Part of being a good teacher is learning how to teach the "process" of learning alongside the required content material. In the grand scheme of teaching, content-specific learning is only a small percentage of what I teach—something I didn't expect when I started my career in education. A large part of succeeding in life (and on achievement tests!), rather than just knowing how to conjugate a French verb, is knowing the habits, routines, and learning skills that students master *while* learning those French verbs. With this in mind, it is much easier to keep the task at hand in perspective. If a teacher focuses on fundamental strategies such as organization and planning, and inextricably links these strategies to the operation of the classroom, these concepts become second nature to the students. Students are better able to absorb and learn the content-specific material because they have the tools necessary to do so.

Kelly L. Hoy • 5th-Grade Humanities Teacher
Katherine Delmar Burke School, San Francisco, CA

In an elementary school classroom, organizational skills are central to alleviating stress for students, teachers, and even parents. From the desk to the binder to the backpack, somehow students' paperwork mysteriously disappears. There are ways to battle the infamous "black hole" book bag or desk. Teachers should take time at the end of each period to clearly state where the assignment should be placed, and each child can give a signal that his or her paper is in the correct place. For time-sensitive projects, having different dates in which notes, drafts, and final projects are due will help students learn time management. Students can check off that they have the correct materials in assignment logs and get a teacher's initials. Periodic "book bag checks" can help students organize their book bags for homework.

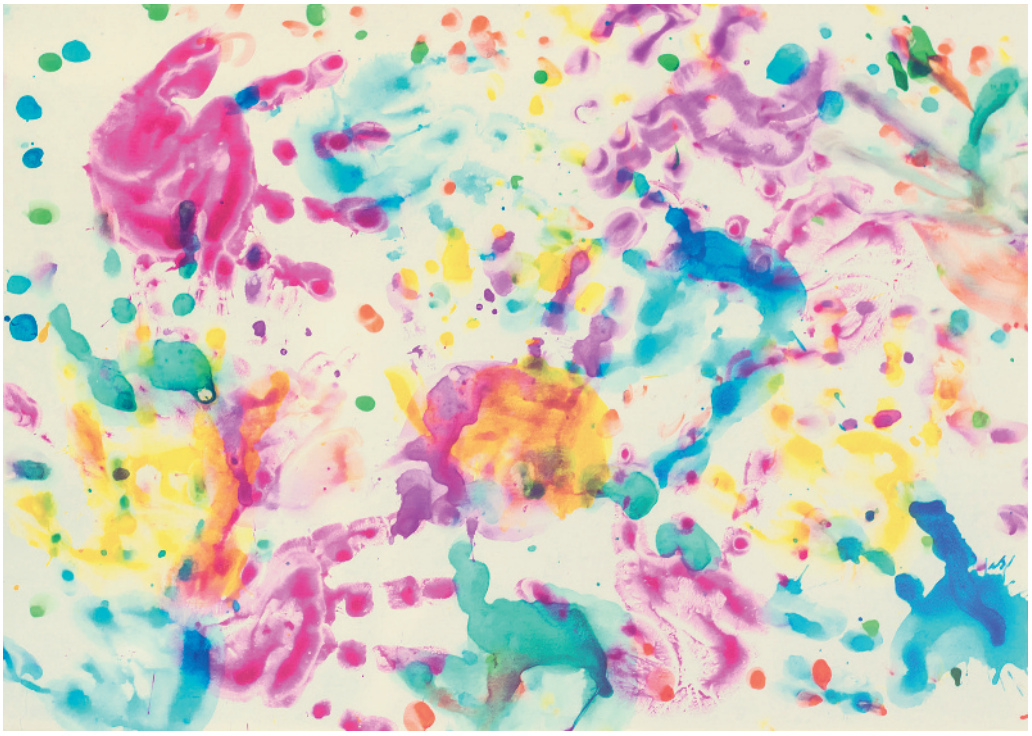
Patricia A. Smith • High School Math Teacher
Earl Warren High School, San Antonio, TX

In my high school mathematics classes, I spend the first 2 months of the school year training my students in organizational skills. All of my students are given a schedule that outlines topics of discussion, assignment due dates, and quiz and test dates. I also give each of them a "scorecard" where they keep track of their own grades. This serves as a double check for me as the teacher and also provides a sense of ownership of earned grades to the students.

All my students have a three-ring binder with a plastic cover–; their schedule fits inside the plastic cover. Early in the year, I start every class with a look at the schedule and question students on assignment due dates. In addition, I collect all assignments and tests in colored folders unique to each class section. When the students walk into my classroom and see their designated color of folder on my desk, they know that something is due. Most of my quizzes are the take-home variety. I place them on a table in the back of the room, and students are responsible for locating, completing, and returning them. In fact, I put them out several days in advance and do not accept late quizzes, thereby increasing student responsibility and organization. Graded papers are also processed in the same manner, thereby perpetuating the new and orderly system and disabling the old unorganized ways.

Cluster 12

Motivation in Learning and Teaching



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Teachers' Casebook:

Motivating Students When Resources Are Thin What Would You Do?

It is July, and you have finally secured a teaching position for the fall. You have a number of ideas you hope will inspire learning in students. However, you are discovering that the teaching resources in the school where you will teach are slim to none; the only materials available are some aging texts and the workbooks that go with them. Every idea you have suggested for software, learning apps, simulation games, science project supplies, field trips, or other, more active teaching materials has been met with the same response: "There's no money in the budget for that." As you look over the texts and workbooks, you wonder how the students could be anything but bored by them. Also, you note that the texts look pretty high level for the grade level and student community. But the objectives in the workbooks are important. Besides, the district curriculum requires these units. Students will be tested on them in district-wide assessments next spring, so you want to do a good job of supporting students' learning.

Critical Thinking

- How would you arouse student curiosity and interest about the topics and tasks in the workbooks?
- How would you establish the value of learning this material?
- How would you handle the difficulty level of the texts?
- What do you need to know about motivation to solve these problems?
- What do you need to know about your students to motivate them?

Overview and Objectives

Most educators agree that motivating students is one of the critical tasks of teaching. To learn, students must be cognitively, emotionally, and behaviorally engaged in productive class activities. We begin with the question "What is motivation?" and examine many of the answers that have been proposed, including a discussion of intrinsic and extrinsic motivation. You already know quite a bit that applies to motivation based on your understanding of behavioral, cognitive, social cognitive, and sociocultural theories of learning.

Next, we consider more closely five broad factors or themes that frequently appear in discussions of motivation: needs and self-determination, goal orientations, expectancies and values, attributions and beliefs, and feelings such as interests, curiosity, flow, or anxiety. How do we put all this information together in teaching? How do we create environments, situations, and relationships that encourage motivation and engagement in learning? First, we consider how the influences on motivation come together to support motivation to learn. Then we discuss a number of strategies for developing a motivational climate in your classroom and provide a toolkit for helping your students stay motivated.

By the time you have completed this cluster, you should be able to:

12.1 Define motivation and describe the differences between intrinsic and extrinsic motivation.

12.2 Explain how learners' needs—including the needs for competence, autonomy, and relatedness—influence their motivation to learn.

12.3 Describe the different kinds of goal orientations and examine their influences on motivation.

12.4 Discuss how students' expectations for success, value of the task, and perceptions of cost can influence motivation.

12.5 Discuss how students' beliefs and attributions about their school experiences and their ability mindsets can influence motivation.

12.6 Describe the role of interests, curiosity, flow, emotions, and anxiety in motivation.

12.7 Explain how teachers can influence and encourage students' motivation to learn.

We began our examination of motivation in the previous cluster when we explored students' beliefs about their capabilities—their self-efficacy. We broaden our examination of motivation in this cluster given the influential and important role motivation plays in students' social interactions and academic achievement in your classroom. Students with the same abilities and prior knowledge may perform quite differently, based on their motivation (Wentzel & Miele, 2016). So how does that work? Let's start with a basic question: What is motivation?

OUTLINE

Teachers' Casebook—Motivating Students When Resources Are Thin: What Would You Do?
Overview and Objectives

MODULE 36: Motivation Basics and the Role of Needs
What Is Motivation?
- Meeting Some Students
- Intrinsic and Extrinsic Motivation
- What You Already Know About Motivation

Needs and Self-Determination
- Maslow's Hierarchy of Needs
- Self-Determination: Need for Competence, Autonomy, and Relatedness
- Needs: Lessons for Teachers

MODULE 37: Goals, Values, and Ability Beliefs
Goals and Goal Orientations
- Goal Setting: What Am I Trying to Do?
- Making Goals Work: Feedback, Framing, and Commitment
- Goal Orientations: Why Am I Trying to Do This?
- Social Goals
- Goals: Lessons for Teachers

Expectancies, Values, and Costs
- Expectancy for Success
- Task Value
- Perceived Cost
- Expectancy, Value, and Cost: Lessons for Teachers

Attributions and Beliefs About Ability
- Attributions in the Classroom
- Teacher Attributions Trigger Student Attributions
- Mindsets About Ability
- Ability Mindsets in the Classroom
- Mindsets About Failure
- Attributions and Mindsets: Lessons for Teachers

MODULE 38: Interests, Curiosity, and Emotions
How Do You Feel About Learning? Interest, Curiosity, and Emotions
- Tapping Interests
- Curiosity: Novelty and Complexity

Flow
Emotions
Anxiety in the Classroom
Reaching Every Student: Coping with Negative Emotions
Interest, Curiosity, and Emotions: Lessons for Teachers

MODULE 39: Supporting Students' Motivation to Learn
Strategies to Encourage Motivation to Learn
Why Am I Learning This? Is It Valuable, Useful, Relevant?
Will I Enjoy This?
Can I Do It? Building Confidence and Positive Expectations
What Do I Need to Do to Succeed? Providing Structures That Support Progress
Do I Belong in This Classroom? Creating Inclusive Opportunities

Cluster 12 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Motivating Students When Resources Are Thin: What Would They Do?

MODULE 36 Motivation Basics and the Role of Needs

Learning Objective 12.1 Define motivation and describe the differences between intrinsic and extrinsic motivation.

Learning Objective 12.2 Explain how learners' needs—including the needs for competence, autonomy, and relatedness—influence their motivation to learn.

What Is Motivation?

Motivation is usually defined as the processes that initiate, direct, and sustain behavior. What are the underlying processes that help explain why students do what they do? We can think of motivation in terms of different components, such as needs, goals, and beliefs. We can also focus on the reasons why people do what they do—whether those are more internal or external. Knowing about the different components of motivation and the factors that affect motivation helps to explain why some students put forth more effort, persist longer, learn more, and score higher on tests (Lazowski & Hulleman, 2016).

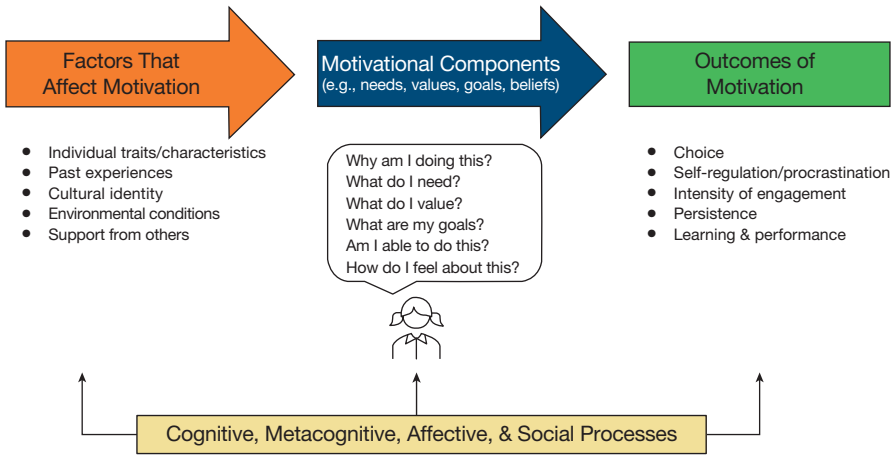
Motivation
An internal state that arouses, directs, and maintains behavior.

Psychologists study motivation as part of a process or sequence that takes place over time (Graham & Weiner, 2012). Motivational components, the middle section of Figure 12.1, include the needs, goals, values, and beliefs learners have. Consider the different motivational questions that help us evaluate our own motivation (e.g., Do I value this activity? Can I do it?). But it's also important to consider what factors contributed to those particular motives (the left side of the figure). For example, knowing about a student's past experience and social setting helps explain why they may have certain needs, goals, or beliefs. What are the behaviors and outcomes associated with motivation (the right side of the figure)? These include the choices students make, their engagement in their learning, and their academic performance. These are only some of the important outcomes of motivational processes. Notice at the bottom of the figure that students' thoughts, feelings, and social circumstances can play a role at each stage. Throughout this cluster, we will examine many motivational sequences, not all of which follow this linear order.

We all know how it feels to be motivated, to move energetically toward a goal, or to work hard, even if we are not thrilled by the task. But are some people just naturally more motivated than others? Some psychologists have explained motivation in terms of personal *traits* or individual characteristics. Certain people, so the theory goes, are interested in cars or art, so they spend hours in garages or galleries. However, other psychologists see motivation more as a *state*, a temporary event affected by context. If, for example, you are reading this paragraph because you have a test tomorrow, you are motivated (at least for now) by the situation. The motivation

Figure 12.1 Motivation as a Process

We can think about motivation in terms of a process or an episode. Internal and external factors (left) can trigger a learner's motivation (middle). Different motivational components guide what people will do next (right). Thoughts, feelings, and social dynamics can influence all stages of a motivational sequence.



Source: Graphic created by Ellen Usher.

we experience at any given time usually is some combination of internal factors and external situations, and these may be short-lived or more enduring (Deckers, 2018). You may be studying because you are a conscientious learner *and* because you are preparing for a test.

Meeting Some Students

Many factors influence motivation and engagement in learning. To get a sense of the complexity of motivation, let's step into a high school science classroom just after the teacher has given directions for a lab activity. The student profiles are adapted from Stipek (2002).

- *Hopeless Geraldo* won't even start the assignment—as usual. He just keeps saying, "I don't understand" or "This is too hard." When he answers your questions correctly, he "guessed" and he "doesn't really know." Geraldo spends most of his time staring into space; he is falling further and further behind.
- *Safe Sumet* checks with you about every step—he wants to be perfect. You once gave him bonus points for doing an excellent color drawing of the apparatus, and now he produces a work of art for lab every time. But Sumet won't risk getting a B. If it isn't required or on the test, Sumet isn't interested in doing the work.
- *Satisfied Sophia*, on the other hand, is interested in this project. In fact, she knows more than you do about it. Evidently she spends hours reading about chemistry and performing experiments. But her overall grade in your class is between B- and C because she never turns in homework. Sophia is satisfied with the C she can get on tests without even trying.
- *Defensive Drake* doesn't have his lab manual—again—so he has to share with another student. Then he pretends to be working but spends most of his time making fun of the assignment or trying to get answers from other students when your back is turned. He is afraid to try because if he makes an effort and fails, he fears that everyone will think he is "dumb."
- *Anxious Aimee* is a good student in most subjects, but she freezes on science tests and "forgets" everything she knows when she has to answer questions in class. Her parents are scientists and expect her to become one, too, but her prospects for this future look dim.

Stop & Think Each of these students presents a different motivational challenge connected to one or more motivation-related areas: (a) choices, (b) getting started, (c) engagement, (d) persistence, or (e) thoughts and feelings. Can you identify the problems? The answers are on page 512.

Although each student you teach will have their own motivational challenges, you will need to figure out how to motivate and teach the entire class. In the next few pages, we will look more closely at the components of motivation so we can better understand students like these.

Intrinsic and Extrinsic Motivation

At some point, most of us probably wonder whether our behavior (or perhaps more often the behavior of those around us) is motivated by internal or by external forces. This isn't always easy to determine! Most psychologists agree that it is impossible to know for sure what motivated a behavior just by looking at what someone does. The essential difference between internal and external motives is a person's *reason* for acting—whether the **locus of causality** for the action (the location of the cause) is internal or external—inside or outside the person. Students who read or practice their backstroke or paint may be reading, swimming, or painting because they freely chose the activity based on personal interests (*internal locus of causality/intrinsic motivation*) or because someone or something else outside is influencing them (*external locus of causality/extrinsic motivation*; Reeve, 2018).

Locus of causality
The location—internal or external—of the cause of behavior.

A classic distinction is made between intrinsic motivation and extrinsic motivation. **Intrinsic motivation** is the natural human tendency to seek out and conquer challenges as we pursue personal interests and exercise our capabilities. When we are intrinsically motivated, we do not need incentives or punishments because the activity itself is satisfying and rewarding (Ryan & Deci, 2020). Satisfied Sophia studies chemistry outside school simply because she loves learning about chemistry; no one makes her do it.

Intrinsic motivation
Motivation associated with activities that are internally rewarding.

In contrast, when we do something to earn a grade, to avoid punishment, to please the teacher, or for some other reason that has very little to do with the task itself, we experience **extrinsic motivation**. We are not really interested in the activity for its own sake; we care only about what it will gain us. Safe Sumet works for the grade; he has little interest in the subject itself. Extrinsic motivation has been associated with negative emotions, poor academic achievement, and maladaptive learning strategies (Corpus et al., 2009). However, extrinsic motivation also has benefits if it provides **incentives** as students try new things, gives them an extra push to get started, or helps them persist to complete a mundane task. Beware of either/or!

Extrinsic motivation
Motivation created by external factors such as rewards and punishments.

Sometimes students have no intention to act at all (e.g., "I don't see why we should have physical education."). Researchers have referred to this as **amotivation**—no engagement at all (Bartholomew et al., 2018).

Amotivation
A complete lack of any intent to act—no engagement at all.

As you think about your own motivation, you probably realize that the dichotomy between intrinsic and extrinsic motivation is too either/or—too all-or-nothing. How can you think about motivation in a more nuanced way? One way is to think of our activities as falling along a continuum from externally determined (by environmental and social factors) to self-determined (through internal processes), as depicted in Figure 12.2 on the next page. For example, some students freely choose to work hard on activities that they don't find particularly enjoyable because they know the activities are important in reaching a valued goal—such as spending hours studying educational psychology to become a good teacher. Those students are freely choosing to accept extrinsic policies, such as licensure requirements, and trying to get the most benefit from the requirements by working hard (Ryan & Deci, 2020). A second way to avoid either/or thinking is to recognize that the same behavior, at any particular time, might be motivated by both intrinsic and extrinsic factors (Vansteenkiste & Mouratidis, 2016). When I (Ellen writing) took part in a triathlon competition, I was motivated by the fitness benefits of my training as well as the internal and external recognition of my accomplishment at the finish line. (I wish I could motivate myself to train that way again!)

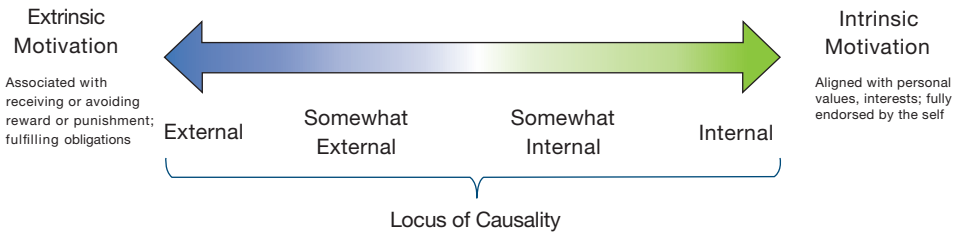
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Promoting Intrinsic Motivation to Learn (I, C2, 3)

For a set of practical tips, guidelines, and suggestions for boosting and maintaining motivation to learn, see the special issue of the journal *Theory Into Practice* published in May 2021 (edited by Bembenutty et al., 2021).

Figure 12.2 The Extrinsic-Intrinsic Motivation Continuum

We can think of our activities as falling along a continuum from fully determined by other people and the external environment (extrinsic motivation) to fully self-determined and internal (intrinsic motivation).



Source: Graphic created by Ellen Usher.

Stop & Think Let's see if you correctly categorized some of the motivation-related factors experienced by the students you met on page 511. They were (a) choices, (b) getting started, (c) engagement, (d) persistence, or (e) thoughts and feelings.

- Hopeless Geraldo has trouble with getting started (b) and with a sense of despair (e); during the activity he feels defeated and helpless.
- Safe Sumet makes good choices (a), gets started right away (b), and persists (d). But he is not really engaged and takes little pleasure in the work (c and e).
- As long as she is following her own choices (a), Satisfied Sophia is prompt in getting started (b), engaged (c), persistent (d), and enjoys the task (e).
- Defensive Drake makes poor choices (a), procrastinates (b), avoids engagement (c), and gives up easily (d) because he is so concerned about how others will judge him (e).
- Anxious Aimee's problems have to do with what she thinks and how she feels as she works (e). Her worry and anxiety may lead her to make poor choices (a) and procrastinate (b), which only makes her more anxious at test time.

Take a moment to reflect on your own motivation in school. Did you find fractions inherently interesting? Was your curiosity piqued by irregular verbs? If teachers count on intrinsic motivation to energize all their students all of the time, they will be disappointed. There are situations in which incentives and external supports are necessary. Teachers must encourage and nurture intrinsic motivation while making sure that what fosters extrinsic motivation also supports learning (Anderman, 2021; Brophy, 2003). This may become more challenging in the upper grades because both intrinsic and extrinsic motivation decline as students move up in grade levels (Scherrer & Preckel, 2019). To combat these trends, teachers need to know about the factors that influence motivation—and there are many. Let's begin by reviewing some of the factors you have already learned about.

What You Already Know About Motivation

Motivation is a vast and complicated subject encompassing many theories and explanations. Some theories were developed through work with animals in laboratories. Others are based on research with humans who took part in studies that involved games or puzzles. The work done in clinical or industrial psychology inspired additional theories as well. Researchers also use surveys and interviews to understand students' and teachers' motivation.

You already know a bit about motivation based on the theories of learning and cognition we discussed earlier in this book. Behaviorists tend to emphasize extrinsic motivation caused by incentives, rewards, and punishment. Cognitive views stress a person's active search for meaning, understanding, and competence, along with the power of the individual's attributions and interpretations. In social cognitive theory, self-efficacy and agency are

central factors in motivation. Self-efficacy is your belief that you can successfully carry out a particular task in a given situation. Sociocultural views emphasize engaged participation and maintaining your identity within a community.

Even though you already have some good ideas about motivation, today there are many more specific explanations for motivation that have implications for teaching. Our examination of these explanations will be selective; otherwise we would never finish. Let's start with some of your personal experiences with motivation.

Stop & Think Why are you reading this cluster? Are you curious about motivation and interested in the topic? Is there a test in your near future? Do you need this course to earn a teaching license or to graduate? Maybe you believe that you will do well in this class, and that belief keeps you working. Maybe you just got caught up in the ideas and can't put the book down. Perhaps it is some combination of these reasons. What motivates you to study motivation?

To organize the many ideas about motivation in a way that is useful for teaching, we will examine five broad themes that are reflected in many contemporary explanations of motivation (Anderman, 2020; Hattie et al., 2020). These include a discussion of needs and self-determination; goals and goal orientations; expectancies, values, and costs; attributions and beliefs about ability; and interest, curiosity, and emotions. Could your answers to the *Stop & Think* questions be sorted into any of these facets of motivation? If you don't know now, you will by the end of this cluster.

Needs and Self-Determination

Early research in psychology viewed motivation in terms of trait-like needs. Three of the main needs studied extensively in this earlier work were the needs for *achievement*, *power*, and *affiliation* (Pintrich, 2003). Abraham Maslow's influential theory emphasized a hierarchy that included all these needs and more.

Maslow's Hierarchy of Needs

Maslow (1970) suggested that humans have a **hierarchy of needs** ranging from lower-level needs for survival and safety to higher-level needs for knowledge, understanding, and finally self-actualization (see Figure 12.3 on the next page). **Self-actualization** is Maslow's term for self-fulfillment, the realization of personal potential—"being all that you can be." Each of the lower-level needs must be fairly well satisfied before the higher-level needs become primary motives.

Maslow (1968) called the four lower-level needs—for survival, safety, belonging, and esteem—**deficiency needs**. Until these needs are satisfied, people tend to focus their energies on relieving their deficiency in these areas and may suffer mentally and/or physically. Once their deficiency needs are reasonably well met, however, people become more motivated by three higher-level needs—cognitive needs, aesthetic needs, and the need for self-actualization. Maslow called these **being needs**, or growth needs. Meeting these higher needs does not diminish motivation because these needs can never be completely filled. Growing in your creativity, knowledge, appreciation of beauty, and full humanness is inherently rewarding and self-sustaining. For example, the more successful you are in your efforts to develop as a teacher, the harder you are likely to strive for even greater improvement.

How does Maslow's theory fit along the intrinsic-extrinsic motivation continuum? Consider the way Maslow (1968) described lower- and higher-order needs as motives:

> Just as all trees need sun, water, and foods from the environment, so do all people need safety, love, and status from their environment… [but] once satiated with these elementary, species-wide necessities, each tree and each person proceeds to develop in [their] own style.… In a very meaningful sense, development then becomes more determined from within rather than from without. (p. 39)

Hierarchy of needs
Maslow's model of seven levels of human needs, from basic physiological requirements to the need for self-actualization.

Self-actualization
Fulfilling one's potential.

Deficiency needs
Maslow's four lower-level needs, which must be satisfied first before higher-level needs can be addressed.

Being needs
Maslow's three higher-level needs, sometimes called *growth needs*.

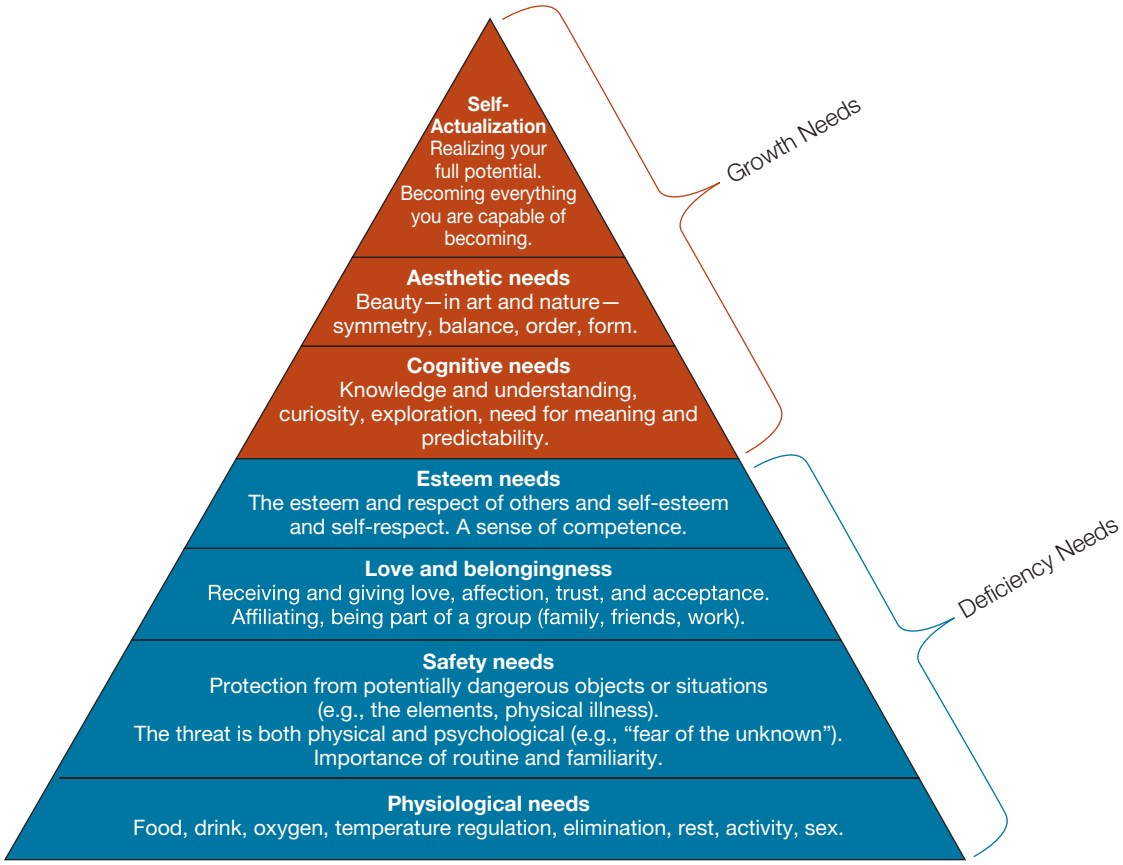
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Maslow (I, C1)

Consider how problems with satisfying Maslow's hierarchy of needs can affect student learning. Link these ideas to direct or vicarious experiences you might have had in school.

Figure 12.3 Maslow's Hierarchy of Needs

Maslow called the four lower-level needs—for survival, safety, belonging, and self-esteem—*deficiency needs* because when these needs are satisfied, the motivation to fulfill them decreases. He labeled the three higher-level needs—cognitive needs, aesthetic needs, and finally self-actualization—*growth needs*, or *being needs*, because when they are met, a person's motivation does not cease.



Source: Graphic created by Ellen Usher.

Several aspects of Maslow's theory have been criticized. People do not always behave as the theory might predict. Most of us move back and forth among different types of needs and may even be motivated by many needs at the same time. Some people deny themselves safety or friendship to achieve knowledge or greater self-esteem. Another critique is that Maslow's theory offers no clear pathway to assessing self-actualization except to describe it as occurring when you are choosing activities that are in full alignment with your truest self.

Criticisms aside, Maslow's theory does give us a way of looking at the whole student, whose physical, emotional, and intellectual needs are all interrelated. Needs affect how learners think, their short-term goals, and how they feel. When children are hungry, they will have trouble focusing on academic learning. A child whose feelings of safety and belonging are threatened by divorce may have little interest in learning how to divide fractions. If school is a fearful, unpredictable place where neither teachers nor students are emotionally safe, they are likely to be more concerned with security and less with learning or teaching. Belonging to a social group and maintaining self-esteem within that group are important to students. If doing what the teacher says conflicts with group rules, students may choose to ignore the teacher's wishes or even defy the teacher.

Self-determination theory is a more recent approach to motivation that focuses on human needs (Reeve, 2018; Ryan & Deci, 2017).

Self-Determination: Need for Competence, Autonomy, and Relatedness

Self-determination theory suggests that humans share three fundamental, basic needs. We all need to feel competent and capable, to have a sense of autonomy and control over our lives, and to be connected to others in relationships. Notice that these are similar to early conceptions of basic needs for achievement (*competence*), power (*autonomy and control*), and affiliation (*relatedness*). The **need for competence** refers to our need to demonstrate ability or mastery over the tasks at hand. Satisfying this need results in a sense of accomplishment, promotes self-efficacy, and helps learners establish better learning goals for future tasks (Kim et al., 2010). The **need for autonomy** is central to self-determination because it refers to the need to be driven by our own wishes and choices rather than external rewards or pressures (Reeve, 2018; Ryan & Deci, 2020). People feel autonomous when they fully endorse what they are doing. Think about how often students (and teachers) lack a sense of autonomy in their everyday tasks. Pressure from external controls such as the rules, schedules, deadlines, and limits imposed by others often threaten the fulfilment of this need. Finally, the **need for relatedness** refers to the desire to belong and to establish close emotional bonds and attachments with others who care about us.

Need for competence
The desire to demonstrate ability or mastery over the tasks at hand.

Need for autonomy
The desire to have our own wishes, rather than external rewards or pressures, determine our actions.

Need for relatedness
The desire to belong and to establish close emotional bonds and attachments with others who care about us.

How does the fulfilment of these three needs relate to students' motivation? When students feel autonomous, competent, and related in school, their reasons for doing things will be more intrinsic. When students perceive their schools or teachers as controlling, unsupportive of their developing competence, or unwelcoming, they become more extrinsically motivated.

Some psychologists have asked whether the needs for competence, autonomy, and relatedness are universal across cultural contexts. For example, teaching and parenting practices in some cultures (e.g., east Asian countries) may be more controlling than in some Western cultures. However, different cultural norms may lead students to interpret such practices differently. For example, a practice that might seem strict and controlling to a student socialized in one context might seem like a sign of care to a student in another cultural context. Nevertheless, studies conducted in diverse cultural settings—including China, Singapore, Brazil, Nigeria, India, Israel, and Korea—have shown that excessively controlling practices thwart students' need for autonomy, competence, and relatedness and undermine their intrinsic motivation to learn (Reeve et al., 2018).

SELF-DETERMINATION IN THE CLASSROOM. According to self-determination theory, "students are fully capable of motivating and engaging themselves. They do not need educators to motivate them" (Reeve et al., 2018, p. 34). Does this mean that teachers do not affect students' motivation? Quite the opposite. Teachers can do a great deal to set up the conditions for students' needs to be met, as we will see throughout this cluster. First, let's take a look at some findings from classroom research.

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Self-Determination (I, C3)
Understand how self-determination can boost or diminish motivation and describe practical steps that teachers can take to establish a sense of self-determination in students.

Classroom environments that support student self-determination (i.e., need satisfaction) are associated with greater student interest and curiosity (even interest in homework assignments), sense of competence, creativity, conceptual learning, grades, school attendance and satisfaction, engagement, use of self-regulated learning strategies, psychological well-being, and preference for challenge. These relationships have been found in research of classrooms from first grade through graduate school (Hafen et al., 2012; Howard et al., 2017; Jang et al., 2012; Moller et al., 2006; Pulfrey et al., 2013; Reeve, 2018; Theis et al., 2020). Researchers have also suggested that classroom practices may affect learners' biological responses. In one experiment, students were exposed to either a highly controlling teacher or an autonomy-supportive teacher. Those with the controlling teacher had higher salivary cortisol levels, which are a marker of stress (Reeve & Tseng, 2011).

Need support may be especially helpful for students who have experienced hardship or deprivation. For example, among adolescent girls living in Malawi, need satisfaction was positively related to intrinsic motivation. The satisfaction of needs was more strongly related to the intrinsic motivation of girls experiencing more socioeconomic hardship (van Egmond et al., 2017).

NEED-SUPPORTIVE VERSUS NEED-THWARTING CLASSROOMS. Experiences such as being praised or criticized, reminded of deadlines, assigned grades, given choices, or lectured about rules can influence students' level of intrinsic motivation by affecting their sense of self-determination. According to self-determination theorists, classroom events have two aspects: *controlling* and *informational*. If an event is highly controlling—if it pressures students to act or feel a certain way—then students will experience less control, and their intrinsic motivation will decrease. If, on the other hand, the event provides information at the appropriate level and without coercion, students' sense of competence and intrinsic motivation will typically increase. Here is an example of a more *controlling* communication:

> Your paper is due on Monday. Today, we are going to the school library. In the library, you will find information from books and Internet sites to use for your paper. Don't waste your time; don't goof off; make sure to get your work done. In the library, you may work by yourself or with a partner. (Reeve, 2009, p. 169)

This teacher may believe that he is supporting autonomy because he offered a *choice*. Contrast his message with the following statement, which gives *information* about why the library visit is valuable:

> Your paper is due on Monday. As a way of helping you write a well-researched paper, we are going to where the information is—the school library. The reason we are going to the library is to find the information you need from books and Internet sites. While there, you may be tempted to goof off, but students in the past have found that a trip to the library was a crucial part of writing an excellent paper. To help you write your best possible paper, you may work in the way you wish—by yourself or with a partner. (Reeve, 2009, p. 169)

Students who perceive their teachers as controlling feel less autonomous, competent, and related to others. They therefore report feeling less intrinsically motivated. For instance, researchers conducted a longitudinal study of high school students' motivation in physical education. Students who were exposed to controlling coaches reported less intrinsic motivation, greater fear of failure, and avoidance of challenges (Bartholomew et al., 2018). On the other hand, when students feel that their teachers support their needs, they are more able and willing to handle challenges. For example, students from 43 high school science classes were asked to respond to daily survey questions about their motivation throughout a challenging six-week unit. Although all students expressed doubts about their competence as the science work became more challenging, those who perceived greater autonomy support from their teachers felt less uncertain and remained more engaged (Patall et al., 2018). Their teachers were more attuned to and accepting of the difficulties students were experiencing in science.

Learning and work quality are also affected by whether the learning environment is supportive of students' needs. Students in controlling environments tend to improve only on rote recall tasks. When students are pressured to perform, they often seek the quickest, easiest solution.

Even though controlling styles of teaching are less effective, teachers are under pressure from administrators, accountability requirements, and cultural expectations to be "in charge," and parents expect good class "discipline." In addition, students can seem passive and unengaged or even defiant. Some teachers equate control with efficient classroom structure or feel more comfortable with a controlling style (Reeve, 2018). Assuming you are willing to resist those pressures, how can you support students' need for autonomy and competence?

One answer is to focus on establishing an informational structure in your classroom that guides and clarifies rather than demands or domineers (Aelterman et al., 2019). An obvious first step is to limit your controlling language (e.g., *must, ought, have to, should*). A second step is to make sure the information you provide highlights students' growing competence by emphasizing gains made through persistence and practice and by encouraging student reflection, for example, on portfolio entries or work samples. The *Guidelines: Supporting Self-Determination and Autonomy* give some more ideas. As you will see, often what supports one need, like autonomy, also supports another, like relatedness.

GUIDELINES

Supporting Self-Determination and Autonomy

Allow and encourage students to make choices.

Examples

1. Design several different ways to meet a learning objective (e.g., a paper, a compilation of interviews, a test, a news broadcast), and let students choose one. Encourage them to explain the reasons for their choice.
2. Appoint student committees to make suggestions about streamlining procedures such as caring for class pets or distributing equipment.
3. Allow students to choose work partners as long as they focus on the task.

Help students plan actions to accomplish self-selected goals.

Examples

1. Experiment with goal cards. Students list their short- and long-term goals and then record three or four specific actions that will move them toward the goals. Goal cards are personal—like credit cards.
2. Encourage middle and high school students to set goals in each subject area, record them in a goal book or on a goal-setting or notes app, and check progress toward the goals on a regular basis.

Hold students accountable for the consequences of their choices.

Examples

1. If students choose to work with friends and do not finish a project because too much time was spent socializing, grade the project as it deserves, and help the students see the connection between lost time and poor performance.
2. When students choose a topic that captures their imagination, discuss the connections between their investment in the work and the quality of the products that follow.

Provide rationales for limits, rules, and constraints.

Examples

1. Explain reasons for rules.
2. Provide a rationale for why a learning activity is worthy of time, attention, and effort.

Acknowledge and accept negative emotions.

Examples

1. Communicate that it is okay (and normal) to feel bored waiting for a turn, for example.
2. Communicate that sometimes important learning involves frustration, confusion, and weariness.
3. Acknowledge students' perspectives: "Yes, this problem is difficult," or "I can understand why you might feel that way."

Use noncontrolling, positive feedback.

Examples

1. See poor performance or behavior as a problem to be solved, not a target of criticism.
2. Avoid controlling language: "should," "must," "have to."
3. Provide unexpected, spontaneous, and genuine praise.

Display patience.

Examples

1. Take the time to listen, observe, and understand what the student is trying to do.
2. Avoid verbal ("hurry up") and nonverbal (clapping, snapping, tapping) signs of impatience.
3. Provide appropriate wait time for a student to think and respond.

For more information on self-determination theory, see http://selfdeterminationtheory.org.

Source: Adapted from *150 Ways to Increase Intrinsic Motivation in the Classroom,* by James P. Raffini. Copyright © 1996, by Pearson Education, "Autonomy-Supportive Teaching: What It Is, How to Do It," by Johnmarshall Reeve, 2016 and *Understanding Motivation and Emotion* (7th ed.), by Johnmarshall Reeve. Copyright © 2018 by Wiley.

SUPPORTIVE RELATIONSHIPS AS MOTIVATORS. Think about your best teachers over the years. What were the qualities that made them great? You probably remember teachers who cared and forged emotional connections with you. Students who feel a sense of connection and relatedness to teachers, parents, and peers are more emotionally engaged in school and more intrinsically motivated (Furrer & Skinner, 2003; Guay et al., 2021; Lawson & Lawson, 2013). Unfortunately, some students feel little sense of membership in their schools or classes. DeLeon Gray (2017) examined high school students' perceptions of "standing out while fitting in"—their belief that they could show up authentically as individuals while also being welcomed as members of their class. Students of color and students who qualified for free or reduced-price school meals were overrepresented among students who felt that their need to fit in was "unfulfilled" or "somewhat fulfilled." When students felt a strong degree of fitting in, they reported greater intrinsic value for learning and more positive academic emotions.

The motivational benefits of feeling a sense of belonging at school have been reported in a recent meta-analysis. Teacher support was the strongest factor predicting student belonging (Allen et al., 2018). All students need caring teachers, but students who are at risk of school difficulties have an even greater need for this kind of teacher. Positive relationships with teachers increase the likelihood that students will succeed in high school and go on to college (Thompson, 2008; Woolfolk Hoy & Weinstein, 2006). In addition, emotional and physical problems—ranging from eating disorders to suicide—are more common among individuals who feel excluded or lack social relationships (Baumeister & Leary, 1995).

As you learned in Cluster 2, your students' social identities are tied to the social groups that they belong to. This means that their individual needs are also associated with the need for their social groups to feel respected by others (Kachanoff et al., 2020). Organizations and school structures that recognize and support students' individual and group identities play an important role in meeting students' need for relatedness and, in turn, their intrinsic motivation. At the end of this cluster, we provide some more specific ways that you can increase students' sense of belonging in your classroom.

Needs: Lessons for Teachers

From infancy to old age, people want to be competent, connected, and personally invested in their pursuits. Students are more likely to participate in activities that help them grow more competent and less likely to engage in activities that hold the possibility of failure. This means that your students need choices and appropriately challenging tasks—not too easy, but not impossible either (Patall & Hooper, 2017). They also benefit from watching their competence grow, perhaps through self-monitoring systems or portfolios. To be connected, students need to feel that people in school care about them and that others can be trusted to help them learn. And don't forget: Supporting students' needs also means attending to your own needs. Teachers who had greater self-compassion (i.e., non-judgmental attitude toward themselves, acceptance of their own shortcomings) reported greater need satisfaction and used more autonomy-supportive strategies with their students (Moè & Katz, 2020).

What else matters in motivation? Many theories include goals as key elements.

Module 36 Summary

What Is Motivation? (pp. 509–513)

Define motivation. Motivation is the processes that initiate, direct, and sustain behavior. The study of motivation focuses on how and why people initiate actions directed toward specific goals, how long it takes them to get started in the activity, how intensively they are involved in the activity, how persistent they are in their attempts to reach these goals, and what they are thinking and feeling along the way.

What is the difference between intrinsic and extrinsic motivation? Intrinsic motivation is the natural tendency to seek out and conquer challenges as we pursue personal interests and exercise capabilities—it is motivation to do something when we don't have to. Extrinsic motivation

is based on factors not related to the activity itself. We are not really interested in the activity for its own sake; we care only about what it will gain us.

How does locus of causality apply to motivation? The essential difference between intrinsic and extrinsic motivation is the person's reason for acting, that is, whether the locus of causality for the action is inside or outside the person. If the locus is internal, the motivation is intrinsic; if the locus is external, the motivation is extrinsic. Most motivation has elements of both. In fact, intrinsic and extrinsic motivation may be two separate tendencies—both can operate at the same time in a given situation.

What do you already know about motivation? Behaviorists tend to emphasize extrinsic motivation caused by incentives, rewards, and punishment. Cognitive views stress a person's active search for meaning, understanding, and competence and the power of the individual's attributions and interpretations. In social cognitive theory, self-efficacy and agency are central factors in motivation. Self-efficacy is your belief that you can execute particular behaviors at a particular level in a given situation. Sociocultural views emphasize engaged participation and identity within a community.

What are six current explanations of motivation? To organize the many ideas about motivation in a way that is useful for teaching, we examined six broad areas or approaches. Most contemporary explanations of motivation include a discussion of needs and self-determination, goals, expectancies and values, attributions, self-beliefs, and finally, the emotional "hot" side of motivation—interests, curiosity, and anxiety.

Needs and Self-Determination (pp. 513–518)

Distinguish between deficiency needs and growth needs in Maslow's theory. Maslow called four lower-level needs *deficiency needs*: survival, safety, belonging, and self-esteem. When these needs are satisfied, the motivation for fulfilling them decreases. He labeled the three higher-level needs *growth* or *being needs*: cognitive needs, aesthetic needs, and self-actualization. When they are met, a person's motivation increases to seek further fulfillment.

What are the basic needs that affect motivation, and how does self-determination affect motivation? Self-determination theory suggests that motivation is affected by the need for competence, autonomy, and relatedness. When these core needs are met, students experience self-determination and are intrinsically motivated. They are more interested in their work, have a greater sense of self-esteem, and learn more. When teachers communicate with students by providing information rather than seeking to control them, students' intrinsic motivation is supported. In addition, teachers must acknowledge the students' perspective, offer choices, provide rationales for limits, and treat poor performance as a problem to be solved rather than a target for criticism.

MODULE 37 Goals, Values, and Ability Beliefs

Learning Objective 12.3 Describe the different kinds of goal orientations and examine their influences on motivation.

Learning Objective 12.4 Discuss how students' expectations for success, value of the task, and perceptions of cost can influence motivation.

Learning Objective 12.5 Discuss how students' beliefs and attributions about school experiences and their ability mindsets can influence motivation.

Goals and Goal Orientations

When students strive to read a book or make a 4.0 GPA, they are involved in goal-directed behavior. In pursuing goals, students are generally aware of some current condition (I haven't even opened my book), some ideal condition (I will read and understand every page), and the discrepancy between the two (I should read and take notes on this reading

today). Goals motivate people to act to reduce the discrepancy between "where they are" and "where they want to be." Goal setting is usually effective for me. In addition to the routine tasks, such as eating lunch, which will happen without much attention, I often set goals for each day. For example, today I intend to finish this section, walk at least 8,000 steps, grade my students' response papers, and make a quiche for dinner (I know—not too exciting). Having decided to do these things, I will feel uncomfortable if I don't complete the list.

Goal Setting: What Am I Trying to Do?

According to Locke and Latham (2002), there are four main reasons why goal setting improves performance. Goals:

1. *Direct attention* to the task at hand and away from distractions. Every time my mind wanders from this reading, my goal of finishing the section helps snap me back.
2. *Energize effort*. The more challenging the goal (to a point), the greater the effort.
3. *Increase persistence*. When we have a clear goal, we are less likely to give up until we reach the goal: Hard goals demand effort, and tight deadlines lead to faster work.
4. *Promote the development of new knowledge* and strategies when old strategies fall short. For example, if your goal is making an A and you don't reach that goal on your first quiz, you might try a new study approach for the next quiz, such as explaining the key points to a friend.

Goals that are *specific, elaborated, moderately difficult*, and *proximal* (likely to be reached in the near future) tend to enhance motivation and persistence (Anderman, 2021; Schunk et al., 2014). *Specific, elaborated* goals provide clear standards for judging performance. They are much more effective than "do your best" goals (Locke & Latham, 2015). If goals are specific and performance falls short, we keep going. For example, Ralph Ferretti and his colleagues (2009) gave fourth- and sixth-grade students either a general goal for writing a persuasive essay ("write a letter to a teacher about whether students should be given more out-of-class assignments . . .") or the general goal accompanied by specific subgoals such as:

- You need to say very clearly what your opinion or viewpoint is.
- You need to think of two or more reasons to back up your opinion.
- You need to explain why those reasons are good reasons for your opinion. (p. 580)

Students both with and without learning disabilities wrote more persuasive essays when they were given *specific subgoals*. In another study, first-year college students assigned to take part in an intervention that involved writing about their personal goals performed better academically than students in a control condition (Schippers et al., 2020). The more students reflected on their personal goals and the more specific their goals were, the better they performed academically.

Goals that are *moderate in difficulty* provide a challenge, but not an unreasonable one. Finally, goals that can be reached *fairly soon* are not likely to be pushed aside by more immediate concerns. Groups such as Alcoholics Anonymous show they are aware of the motivating value of short-term goals when they encourage their members to stop drinking "one day at a time." Also, breaking a long-term assignment into short-term steps is a way to take advantage of the motivating power of proximal goals. You can probably see that setting attainable goals goes hand in hand with self-efficacy—students' beliefs in their capabilities to perform tasks. In fact, the relationship is reciprocal (Locke & Latham, 2019). Students with higher self-efficacy in an area tend to set higher goals for themselves, and setting and accomplishing manageable goals raises their self-efficacy (Schunk & DiBenedetto, 2020). Teachers can enhance motivation by supporting both goals and beliefs.

Making Goals Work: Feedback, Framing, and Commitment

Setting specific and attainable goals is helpful, but three additional factors affect how likely it is that we will realize our goals. The first is *feedback*. To be motivated by a discrepancy between "where you are" and "where you want to be," you must have an accurate sense of both your current status and how far you have to go. Feedback that shows us our progress is most effective. Like many others, for instance, I wear a personal feedback device. I keep my smartwatch on everywhere I go because it lets me know how far I've walked and how many more steps I need to reach my goal. When feedback is designed to highlight progress (e.g., "You are 25% of the way to accomplishing your goal!") rather than deficits ("You still have 75% of your goal left to complete!"), self-efficacy and perseverance are enhanced (Bandura, 1997). Third-grade students who were given progress feedback on their writing along with a goal-setting exercise improved significantly more in their writing fluency compared with students who only had a goal (Koenig et al., 2016).

The second factor affecting motivation to pursue a goal is *goal framing*. Relational goal structures—whether goals are framed as cooperative, competitive, or individualistic—affect motivation. Table 12.1 shows how these three goal structures differ and what their possible effects are on motivation-related outcomes. When goals are framed in competitive terms, students' performance and peer relationships are worse than when goals are shared by members of the same group (Roseth et al., 2008). Cooperative learning structures, as you saw in Cluster 10, can facilitate motivation by promoting a sense of belonging, collective efficacy, and shared investment in learning. Cooperation helps students set attainable goals

Table 12.1 Goal Framing Through Different Relational Goal Structures

Each goal structure is associated with a different relationship between the individual and the group. This relationship influences motivation to reach the goal.

GOAL FRAMING	DEFINITION	EXAMPLES	POSSIBLE EFFECTS
COOPERATIVE	Students believe their goal is attainable only if other students will also reach the goal.	• Team sports • Relay race • Quilting bee • A class garden • A symphony • A play	• Social inclusion • Positive peer relationships • Better grades • Fewer behavioral problems • Greater task value, interest • Collective efficacy beliefs • Social trust
COMPETITIVE	Students believe they will reach their goal if and only if other students do not reach the goal.	• Singles tennis match • Speech contest • 100-yard dash • School valedictorian • Beauty pageant • College scholarships	• Extrinsic motivation • Social exclusion • Negative intergroup dynamics • Stress, negative affect • Marginalization of some • Performance goals • Comparative self-evaluations
INDIVIDUALISTIC	Students believe that their own attempt to reach a goal is not related to other students' attempts to reach the goal.	• Fitness goals • Learning a new language • Making honor roll • Enjoying a museum • Losing/gaining weight • Stopping smoking	• Intrinsic motivation • Interest • Value • Mastery experience • Intrapersonal growth • Disconnectedness from others

Sources: Johnson & Johnson (1999); Roseth et al., (2008); Van Ryzin & Roseth (2018)

and negotiate when learning tasks are complex. When the goal of a learning task is framed in a way that connects it to students' intrinsic needs (i.e., to become more competent, self-directed, and connected with others), then students process information more deeply and persist longer to gain a conceptual (not superficial) understanding (Boden et al., 2020). On the other hand, linking the activity to the extrinsic goals of meeting someone else's standards promotes rote learning—not deep understanding or persistence (Vansteenkiste et al., 2006).

The third factor is *goal commitment*. Commitment matters: The relationship between higher goals and better performance is strongest when people are committed to their goals (Locke & Latham, 2002). If students reject goals set by others or refuse to set their own goals, then their motivation will suffer. So, rather than establishing the goals for the students directly, teachers can promote higher goal acceptance if the students are involved in setting goals and make an active commitment to the goal—for instance, by writing goals down and checking them off as they reach them. Involving students in this process also supports their need for autonomy. Sharing goals with a respected friend or teacher may also increase goal commitment (Klein et al., 2020).

Goal Orientations: Why Am I Trying to Do This?

Another motivational aspect of goals has to do with the *reasons why* people want to accomplish their goals or aims. Why, for instance, does my friend want to run an ultra-marathon? Why does another friend post constantly to Instagram? Why do some of my students seek out harder projects to work on while others choose to work on easier ones?

Stop & Think On a scale from 1 (*Strongly Agree*) to 5 (*Strongly Disagree*), rate your level of agreement with these statements: The main reason I do my work for this class is . . .

_____	To learn more about the topic	_____	To keep my GPA high
_____	To know more than the others	_____	To show how smart I am
_____	To become a better teacher	_____	To avoid performing poorly
_____	To avoid looking incompetent	_____	To outperform others in the class

Goal orientations
Patterns of beliefs about goals related to achievement in school.

Goals are specific targets. But the preceding statements reflect your goal *orientation*. **Goal orientations** are the *reasons* we pursue goals and the *standards* we use to evaluate progress toward those goals. For example, your target might be to make an A in this course. Are you doing so to *master* educational psychology—to learn all about it—or to *perform*—to look good in the eyes of your friends and family? Although there are many reasons why people pursue different goals, most researchers have focused on two main goal orientations—mastery and performance (Urdan & Kaplan, 2020). A mastery goal orientation focuses on individual development and learning. A performance goal orientation focuses on a demonstration of competence to others or outperforming others. In the *Stop & Think* exercise you just completed, can you tell which goal orientations are reflected in the different answers? Most of the questions were adapted from popular achievement goal orientation measures (Hulleman et al., 2010).

Mastery goal
A personal intention to improve abilities and learn, no matter how performance suffers.

The point of a **mastery goal** (also called a *task goal* or *learning goal*) is to improve, to learn, no matter how awkward you appear. When students set mastery goals, they are more invested, especially if they feel they have choices and a sense of autonomy (Benita et al., 2014; Michou et al., 2016). Students with mastery goals tend to seek challenges, persist when they encounter difficulties, and feel better about their work (Goetz et al., 2016; Rolland, 2012). They focus on the task at hand and are not worried about how their performance "measures up" in comparison to that of others in the class. We often say that people who are mastery goal oriented "get lost in their work." In addition, they are more likely to seek appropriate help, use deeper cognitive processing strategies, apply better study strategies, and generally approach academic tasks with confidence (Anderman & Patrick, 2012; Senko et al., 2011).

Students with **performance goals** (also called *ability goals* or *ego goals*) care about demonstrating their ability to others. They may be focused on getting good test scores and grades, or they may be more concerned with winning and beating other students. Students whose goal is outperforming others may do things to look smart, but sometimes they act in ways that actually interfere with learning. For example, they may cheat or use shortcuts to get finished, work hard only on graded assignments, be upset and hide papers with low grades, choose tasks that are easy, avoid collaborating with other students, and be very uncomfortable with assignments that have unclear evaluation criteria (Anderman & Anderman, 2014; Senko et al., 2011). Competitive structures can encourage performance goals. Some of my (Ellen's) fifth-grade students wanted to earn the schoolwide award for "reading the most books," but this performance goal led them to select short and less challenging books to read.

Performance goal
A personal intention to seem competent or perform well in the eyes of others.

WAIT—ARE PERFORMANCE GOALS ALWAYS BAD? Performance goals sound pretty dysfunctional, don't they? Earlier research indicated that performance goals generally were detrimental to learning, but like extrinsic motivation, a performance goal orientation may not be all bad, all of the time. In fact, some research indicates that both mastery and performance goals are associated with using active learning strategies and high self-efficacy (Midgley et al., 2001). Under certain learning conditions, such as when trying to outperform others, pursuing performance goals has been related to higher achievement (Senko, 2016, 2019). And, as is the case with intrinsic and extrinsic motivation, students can, and often do, pursue mastery and performance goals at the same time (Schwinger et al., 2016). For example, you may want to really understand educational psychology but also get a top grade in your class (Anderman & Patrick, 2012).

To account for these findings, educational psychologists have examined another dimension of students' goal orientations: approach or avoidance. Students may be motivated to either *approach* mastery (i.e., to learn as much as possible) or *avoid* misunderstanding (i.e., out of fear of not achieving mastery). They may likewise be motivated to demonstrate their competence to others—a performance *approach* orientation, or they might be highly motivated to avoid looking incompetent—a performance *avoidance* orientation. Table 12.2 shows examples and the effects of each kind of goal orientation in this 2 × 2 framework. Where do you see the most problems with each orientation? Do you agree that the real problems are with avoidance? Students who fear misunderstanding (mastery-avoidance) may be perfectionists—focused on getting it exactly right or afraid they will never live up to

Table 12.2 Goal Orientations

Students may have either an approach or an avoidance focus for mastery and performance goal orientations. They may hold several orientations at once.

GOAL ORIENTATION	APPROACH FOCUS	AVOIDANCE FOCUS
Mastery	*Focus:* Mastering the task, learning, understanding *Standards Used:* Self-improvement, progress, deep understanding	*Focus:* Avoiding misunderstanding; fear of not living up to potential *Standards Used:* Past performance, perfectionism, imagined best or past personal best (e.g., I must avoid being worse than I was before)
Performance	*Focus:* Being superior, winning, being the best, seeming competent to others *Standards Used:* Normative—getting the highest grade, beating the competition, being number one	*Focus:* Avoiding demonstration of low ability, avoiding losing, avoiding being last, not looking incompetent *Standards Used:* Normative—not being the worst/slowest, not getting the lowest grade

Source: Adapted from Schunk, D. H., Meece, J., & Pintrich, P. R. (2014). *Motivation in education: Theory, research, and applications* (4th ed.). Pearson Education, Inc. and Urdan, T. C., & Kaplan, A. (2020). The origins, evolution, and future direction of achievement goal theory. *Contemporary Educational Psychology, 61*.

their potential. Students who try to avoid looking incompetent (performance-avoidance) may adopt defensive, failure-avoiding strategies like Defensive Drake, described earlier—they might cheat, pretend not to care, or make a show of "not really trying" so they have an excuse for failure (Harackiewicz & Linnenbrink, 2005; Linnenbrink-Garcia & Patall, 2016). Research in both Eastern and Western cultures has demonstrated that failure-avoiding strategies are associated with student helplessness, truancy, disengagement from school, negative emotions, and lower academic achievement (De Castella et al., 2013; Huang, 2016).

Two final cautions—performance-approach goals can turn into performance-avoidance goals if students are not successful in looking smart or winning. The path might even lead from performance approach (trying to win) to performance avoidance (saving face and trying not to look incompetent) to learned helplessness (I give up!). So teachers are wise to avoid trying to motivate using competition and social comparisons (Brophy, 2005). In addition, performance-approach and performance-avoidance goals tend to be moderately correlated, so students may pursue both types of performance goals at once (Linnenbrink-Garcia et al., 2012).

WORK-AVOIDANCE GOALS. Some students don't want to learn, look smart, or avoid looking like they are less capable. They just want to finish fast or escape work altogether, perhaps because they expect to fail or maybe because they just are not interested (Schunk et al., 2014). John Nicholls called these students **work-avoidant learners**—they feel successful when they don't have to try hard, when the work is easy, or when they can "goof off" (Nicholls & Miller, 1984). To escape work, these students may say the assignment is too hard or too long, disrupt class, make excuses for not working, or cheat. Of course, if you avoid work using these strategies, you don't learn much and probably don't enjoy school either (King & McInerney, 2014).

Work-avoidant learners
Students who don't want to learn or to look smart but just want to avoid work.

CONTEXTUAL INFLUENCES ON GOAL ORIENTATION. How might the learning context in your school or classroom affect students' goal orientation? Goals are constructed as part of the reciprocal interactions of person, environment, and behavior described by social cognitive theory (Urdan & Kaplan, 2020). For example, in a highly competitive classroom environment, students might be more likely to adopt performance goals. In contrast, in a supportive, learner-centered classroom, even a student with a lower sense of self-efficacy might be encouraged to aim for higher mastery goals. Furthermore, when students work collaboratively to promote each other's mutual success, their mastery goals are better predictors of their success (Levontin & Bardi, 2018).

Researchers have assessed the way students and teachers perceive their *classroom goal structure*—the goals that they think are emphasized in that class (Murayama & Elliot, 2009). Lisa Bardach and her colleagues (2020) conducted a meta-analysis of 68 studies of classroom goal structures. They found that students' personal goal orientations were aligned with the goal structures their teachers used in class. When teachers established a positive motivational climate that promoted learning and mastery, students had significantly higher mastery goals. These and similar results suggest that challenge, support, and a focus on learning (not on "looking good" or avoiding poor performance) seem to create a positive classroom environment in the short term that supports learners' academic success in the long term (Ramos et al., 2021).

Researchers have recognized that the motivation and meaning behind students' goals may also be affected by their cultural context (Zusho & Clayton, 2011). For example, Minhye Lee and Mimi Bong (2016) asked several hundred Korean middle schoolers to list and then rank by order of importance the reasons why they studied. Overall, students listed reasons having to do with social status (the desire to attain a better social standing at school or in life). However, when describing their present class-specific goals, students were more likely to describe mastery goals. The authors concluded that "the type of achievement goal students pursue depends heavily on the dominant culture in the achievement setting" (p. 290).

Social Goals

Social goals
A wide variety of needs and motives to be connected to others or part of a group.

Another category of goals becomes more important as students move from childhood to adolescence—**social goals**. Social goals refer to the reasons why students interact (or refrain from interacting) with others. This may include the goal to make friends, become liked by others, exert control over others, seek help, or develop prosocial behaviors (Jones, 2020).

Classrooms and schools are social environments, and therefore it makes sense that students' academic and social goals would be connected.

You learned in previous clusters that students develop their social and emotional competencies in concert with their academic and cognitive skills. As a primary socializing space, schools provide opportunities for nonacademic goal pursuits such as athletics, dating, and "hanging out," which can compete with schoolwork. Some social goals are related to learning. For example, selecting friends who are mastery-oriented in school leads students to adopt similar goals (Juvonen & Knifsend, 2016). Sometimes social goals impede learning. For instance, adolescents' goal of maintaining friendly relations can get in the way of learning when cooperative learning group members don't challenge wrong answers or misconceptions because they are afraid of hurting each other's feelings (Tschannen-Moran & Woolfolk Hoy, 2000). On the other hand, the goal of bringing honor to your family or team by working hard or being part of a peer group that values academics can also support learning (Pintrich, 2003; Rogat & Linnenbrink-Garcia, 2019; Ryan, 2001; Zusho & Clayton, 2011). A desire to be socially included is associated with students' emotional well-being and self-esteem. In one study, students who sought out social relationships were more likely to report positive emotional conditions such as joy, whereas students who avoided relationships reported higher levels of fear, shame, and sadness (Shim et al., 2013).

We have talked about goals in separate categories, but students can and do pursue several, often competing goals at once (Darnon et al., 2010; Vansteenkiste & Mouratidis, 2016). Students have to coordinate their goals so they can make decisions about what to do and how to act. What if interest in doing homework is overtaken by interest in a video game or a romantic text message exchange? What if students do not see a connection between achievement in school and success in life, particularly because discrimination and inequity present barriers to their success? They are not likely to set academic mastery as a goal. The need for peer relationships is basic and strong for most people, but what if social and academic goals are incompatible because peer groups do not value school? Sometimes, "fitting in" with the peer group means not achieving in school—and succeeding in the peer group is more important (Gray, 2014).

Goals: Lessons for Teachers

Students are more likely to work toward goals that are clear, specific, reasonable, moderately challenging, and attainable within a relatively short period of time. If teachers focus on student performance, high grades, and competition, they may encourage students to set performance avoidance goals. This could undermine the students' ability to get deeply engaged in the task and set them on a path toward alienation from learning in school and learned helplessness (Anderman, 2021; Brophy, 2005). Students may not yet be experts at setting their own goals or keeping these goals in mind, so encouragement and coaching are necessary. Feedback should compare students to themselves, not to others in the class—other-comparisons encourage students to avoid looking bad instead of striving to learn. If you use any reward or incentive systems, be sure the goal you set is to learn and improve in some area, not just to perform well or look smart. And be sure the goal is not too difficult. Students, like adults, are unlikely to stick with tasks or respond well to teachers who make them feel insecure or incompetent, which leads us to our next topic—the power of expectations in motivation.

Expectancies, Values, and Costs

Many influential explanations of motivation can be characterized as **expectancy × value theories**. This means that motivation is seen as the product of two main forces: the individual's *expectation* of reaching a goal and the individual's *value* of that goal. In other words, the important questions are "If I try hard, will I succeed?" and "If I succeed, will the outcome be valuable or rewarding to me?" A related piece of the value part of the equation is the perceived *cost* of engaging in an activity: "How much will doing this cost me?" Notice that expectancy, value, and cost are personal interpretations—maybe I really won't succeed,

Expectancy × value theories
Explanations of motivation that emphasize individuals' expectations for success combined with their valuing of the goal.

or perhaps the success won't be rewarding—but perception is more powerful than reality in influencing motivation (Eccles & Wigfield, 2020).

Motivation is a product of expectancy and value because if either factor is low (or if cost is too high), then there is little motivation to work toward a goal. For example, if I believe I have a good chance of making the basketball team (high expectation) and if making the team is very important to me (high value), then my motivation should be strong. But if either factor is low (I believe I don't have a chance of making the team, or I couldn't care less about playing basketball), then my motivation will be low, too. Let's look at these motivational components more closely.

Expectancy for Success

Expectancy for success
Students' beliefs about how well they will perform on an upcoming task.

Students usually have an idea about how well they will do on their school assignments. This belief is a student's **expectancy for success** (How well will I do?). We talked quite a bit about expectations in Cluster 11 when we discussed social cognitive theory and self-efficacy. When thinking about whether they will be successful, students likely consider their beliefs about their personal capabilities (**self-efficacy**; Can I do this task?) and their more general academic self-concept (Am I a good student?). If you think expectancies and ability beliefs have a lot in common, you are right. Expectations for success, self-efficacy, and academic self-concept are correlated (Marsh et al., 2019). However, they are distinct. For example, a student may have high self-efficacy for solving equations, but when she learns that her algebra teacher tends to grade some students more favorably, she lowers her expectancy for success (Usher, 2015). Despite the student's strong self-efficacy, her teacher's bias leads her to lower her expectation for success and, likely, her overall motivation in math.

Self-efficacy
A sense of being able to deal effectively with a particular task. Beliefs about your personal capabilities in a particular situation.

Students' expectancies for success and their ability beliefs are strong predictors of how well they will perform in school (Wigfield et al., 2016). Students' beliefs about their abilities in one subject area may differ from their beliefs in another subject area, leading to different educational pathways over time. For example, one study showed that between Grades 1 and 12, some students' beliefs about their math and language arts abilities became increasingly divergent and were related to their educational and career choices (Gaspard et al., 2020). Students whose ability beliefs remained more stable (i.e., did not decline throughout their schooling) were more likely to take advanced classes and have higher aspirations. Expectations and ability beliefs predict achievement, but what about the value side of the equation?

Task Value

Value
An individual's belief about the extent to which a task or assignment is generally useful, enjoyable, or otherwise important.

Value is an individual's belief about the extent to which a task or assignment is generally useful, enjoyable, or otherwise important. Perceptions of value predict the choices students make about participating in a task or activity in the first place, such as whether to work hard on an assignment, enroll in advanced science classes, or join the track team (Wigfield & Eccles, 2020).

Importance or attainment value
The importance of doing well on a task; how success on the task meets personal or identity-based needs.

Interest or intrinsic value
The enjoyment a person gets from a task.

Utility value
The usefulness of a task for meeting your goals.

We can think of task value as having four characteristics: importance, interest, utility, and cost (Eccles & Wigfield, 2020; Hulleman & Barron, 2016). **Importance or attainment value** is the personal significance of doing well on the task; this is closely tied to the needs and identity of the individual (e.g., to be well liked, athletic, masculine). For instance, if someone has a strong need to appear smart and believes that a high grade on a test proves you are smart, then the test has high attainment value for that person. A second component is **interest or intrinsic value**. This is simply the enjoyment we get from the activity itself. Some people like the experience of learning. Others enjoy the feeling of hard physical effort or the challenge of solving puzzles. Later in the cluster we will explore interest in greater depth. Tasks also can have **utility value**; that is, they are useful for achieving a short-term or long-term goal.

You can see from our discussion of task value that personal and environmental influences on motivation interact constantly. Often the degree to which we value a task depends on how we have been socialized or our desire to maintain consistency with the norms of our social group. Sometimes social or environmental factors can help us see the value of a task. Personal factors, such as our needs, beliefs, and goals, also affect what we value. Jamaal Matthews (2018) used a mixed method design to study this complexity. He recognized that

many urban Black and Latino adolescents face cultural stigma that might have lowered their perceptions about the value of math. He surveyed, observed, and talked with students to understand their perceptions and found that students of teachers who consistently demonstrated the relevance of math concepts to everyday life (e.g., calculating the slope that a skateboard travels downhill) reported valuing math more. Students' experiences pointed to the ways that race, stigma, and context were related to expectancies and values in math.

Perceived Cost

For all the benefits our chosen activities bring, there are typically costs, too. Jacqueline Eccles and Allan Wigfield (2020) have therefore argued that a more complete understanding of motivation considers costs as a fourth component of how a task is valued. How much energy/effort will be required (effort cost)? What could I be doing instead (loss of valued alternatives)? What are the risks if I fail (emotional cost)? What will others think of me (social cost)? How much energy have I expended already (sunk cost)? Is the cost worth the possible benefit? Acknowledging the cost reminds us that motivation involves not only what "pulls" us toward an activity but also what "pushes" us away because sometimes "the price is not worth it." Like values, perceived costs may be influenced by the sociocultural environment (Tonks et al., 2018). Researchers investigating Korean middle school students' motivation in math found that the more costly students thought math was, the more anxious they felt, the more they procrastinated, and the less organized they were in math (Jiang et al., 2020). Perceived cost is also related to instructional design and delivery. For example, a complex or poorly structured lesson might impose greater extraneous cognitive load on students, which then makes them feel that learning the material is too costly (Feldon et al., 2019).

Expectancy, Value, and Cost: Lessons for Teachers

The strength of our motivation in a particular situation is determined by our *expectation* that we can succeed, the *value* of that success to us, and the *cost* of pursuing the goal (Eccles & Wigfield, 2020). From first grade through graduate school, expectancies, values, and costs predict a number of important outcomes such as choice of activities and courses, persistence, achievement, dropping out of a major, pursuing an advanced degree, and career choices (especially for women). It appears that students must first believe that they can succeed before they will value a task, but it takes both expecting to succeed and valuing a task to maintain a high level of performance and persistence. Also, perceptions of costs—particularly related to how much effort might be required—affect students' performance in science, engineering, mathematics, or technology (STEM) fields and their decisions about whether to pursue STEM careers (Linnenbrink-Garcia & Patall, 2016; Perez et al., 2019). To help students believe that their own success is within their reach, teachers can do all the things described in Cluster 11 to encourage self-efficacy. But they should also make a powerful case for the value of their subject and help students persist in the face of difficulty, even when great effort is needed to succeed.

Attributions and Beliefs About Ability

One well-known explanation of motivation begins with the assumption that humans try to understand the causes of their successes and failures. Particularly when something unexpected happens, we all ask, "Why?" Students might ask themselves, "Why did I flunk my midterm?" or "Why did I do so well this grading period?" or "Why did my teacher say that to me?" They may attribute their successes and failures to any number of factors, such as ability, effort, mood, knowledge, luck, help, interest, clarity of instructions, the interference of others, or unfair policies. We also try to explain other people's behaviors, successes, or failures—that others are smart or lucky or work hard, for example. **Attribution theories** of motivation describe how the individuals' explanations, justifications, and excuses influence their motivation and emotion (Weiner, 2018).

Connect and Extend to PRAXIS II®

Attribution Theory (I, C1)

Go to the *Encyclopedia of Psychology*. Do a web search for "attribution theory" to learn more about using principles derived from this theory to boost intrinsic motivation to learn.

Attribution theories

Descriptions of how individuals' explanations, justifications, and excuses influence their motivation and emotion.

Bernard Weiner and Sandra Graham are two of the educational psychologists responsible for relating attribution theory to school learning (Graham, 2020; Graham & Weiner, 2012; Weiner, 1986, 2018). They argue that most of the attributed causes for successes or failures can be characterized in terms of three dimensions:

1. *Locus* (location of the cause—internal or external to the person). For example, attributing a great piano performance to your musical talent or hard work is an internal attribution. Explaining that the performance is based on coaching from a great teacher is an external attribution.
2. *Stability* (whether the cause of the event is the same across time and in different situations). For example, most people view talent as stable but luck as unstable because luck changes over time.
3. *Controllability* (whether the person can control the cause). For example, your personal effort is controllable, but perhaps your innate musical talent is not.

Every cause for success or failure can be categorized along these three dimensions. For instance, luck is external (locus), unstable (stability), and uncontrollable (controllability). In attribution theory, ability is usually considered stable and uncontrollable, but as we will soon see, intelligence can be viewed as unstable and controllable. The locus and controllability dimensions are closely related to Ryan and Deci's (2020) concept of locus of causality (see Figure 12.2 on page 512).

Graham and Weiner have argued that these three attributional dimensions have important implications for people's motivation because they affect what people expect, what they value, and how they feel. The *stability* dimension, for example, seems to be closely related to expectations about the future. If students attribute their failure to stable factors such as the difficulty of the subject or an unfair teacher, they will expect to keep failing in that subject or with that teacher. But if they attribute the outcome to unstable factors such as mood or luck, they can hope for better outcomes next time. The *internal/external locus* dimension seems to be closely related to feelings of self-esteem. If success or failure is attributed to internal factors, success will lead to pride and increased motivation, whereas failure will diminish self-esteem. The *controllability* dimension is related to achievement emotions. If we feel responsible for our failures, we may feel guilt; if we feel responsible for successes, we may feel pride. Failing at a task we cannot control can lead to shame or anger (Graham, 2020; Weiner, 2018).

Attributions in the Classroom

Students with a strong sense of self-efficacy (see Cluster 11) for a given task ("I can do this math task well") and those who hold a mastery goal orientation ("The reason I am doing this is to learn and improve") tend to attribute their failures to lack of effort ("I should have double-checked my work"), misunderstanding directions, or just not studying enough (Grassinger & Dresel, 2018). These are internal, controllable attributions. As a consequence, students with high self-efficacy usually focus on strategies for succeeding next time. This response often leads to achievement, pride, and a greater feeling of control.

The greatest motivational problems arise when students attribute failures to stable, uncontrollable causes. People with a low sense of self-efficacy ("I cannot do math") tend to attribute their failures to lack of ability ("I'm just dumb"). These tendencies are apparent across age levels, cultural groups, and academic topics (Hsieh & Kang, 2010). Such students may seem resigned to failure, depressed, and/or helpless—what we generally call "unmotivated" (Weiner, 2000, 2010). This can create a downward spiral of failure and concealment.

Learned helplessness
The expectation, based on previous experiences with a lack of control, that all of one's efforts will lead to failure.

When people come to expect that the events and outcomes in their lives are mostly uncontrollable, they can develop **learned helplessness** (Seligman, 1975). To understand the power of learned helplessness, consider this classic experiment (Hiroto & Seligman, 1975): Subjects received either solvable or unsolvable puzzles. In the next phase of the

experiment, all subjects were given a series of solvable puzzles. The subjects who struggled with unsolvable puzzles in the first phase of the experiment usually solved significantly fewer puzzles in the second phase. They had learned that they could not control the outcome, so why even try?

Learned helplessness can lead to *motivational*, *cognitive*, and *affective* challenges. Students who feel hopeless, like Hopeless Geraldo described earlier, expect to fail—why should they even try? So *motivation* suffers. Because they are pessimistic about learning, these students miss opportunities to practice and improve skills and abilities and then might develop *cognitive* deficits. They often suffer from *affective* problems such as depression, anxiety, and listlessness (Alloy & Seligman, 1979).

How can teachers help their students make more healthy attributions? It's important to first understand how the attributions teachers make may be linked to those that their students make.

Teacher Attributions Trigger Student Attributions

When a teacher attributes student failure to forces beyond the student's control, the teacher tends to respond with sympathy and avoid giving punishments. If, however, the teacher attributes the failures to a controllable factor such as lack of effort, the teacher's response is more likely to be irritation or anger, and reprimands may follow. These tendencies seem to be consistent across time and cultures (Weiner, 1986, 2000, 2011).

What do students make of these reactions from their teachers? Sandra Graham (2020) gives some surprising answers. Evidence indicates that when teachers respond to students' mistakes with pity, praise for a "good try," or unsolicited offers to help, students are more likely to attribute their own failure to an uncontrollable cause—usually lack of ability. Does this mean that teachers should be critical and withhold help? Of course not! But it is a reminder that unintended messages may undermine students' motivation.

Graham and other researchers have shown that ethnic minority students could be the victims of well-meaning pity from White teachers—a form of implicit bias. For example, in one experiment, researchers asked White teachers to give feedback on a student's poorly written essay (Harber et al., 2012). Only the student's race was changed across conditions. Teachers' feedback on essays written by Black and Latino students was more positive than on those written by White students. The findings were replicated with undergraduate students as essay raters (Harber et al., 2019). This research suggests that White teachers might "ease up" on requirements or provide more positive feedback to ethnic minority students so that they will "experience success." But an indirect communication may accompany the pity, praise, and extra help: "You don't have the ability to do this, so I will overlook your errors." This kind of feedback, even if motivated by a desire to protect students' self-efficacy or feelings, can be a subtle form of racism.

Teachers can also positively impact students' attributions, with benefits to both achievement and motivation. One way is through attributional retraining. Students who are taught to reframe their thinking about what caused their challenges to occur more adaptively (e.g., by attributing the cause to unstable and controllable factors) feel more optimistic that they can improve their performance (Perry & Hamm, 2017). For example, helping lower-performing students attribute achievement to effort instead of ability has improved their course grades and test performance (Hulleman & Barron, 2016). Guiding adaptive attributions is particularly important in contexts where students have been historically devalued or stigmatized—where they have been sent the message that they "should not" be able to do well (e.g., "Girls aren't good at math."). The *Guidelines: Encouraging a Healthy Mindset* on page 533 discuss more ways to foster adaptive attributions.

Thus far, we have talked about needs, goals, expectancies, values, costs, and attributions, but there is another factor that must be considered in explaining motivation—the underlying "theory" people hold about abilities. Let's start with a basic question: What do students believe about intelligence?

Mindsets About Ability

Stop & Think Rate these statements taken from Dweck (2000) on a scale from 1 (*Strongly Agree*) to 6 (*Strongly Disagree*).

_____You have a certain amount of intelligence, and you really can't do much to change it.

_____ You can learn new things, but you can't really change your basic intelligence.

_____ No matter who you are, you can change your intelligence a lot.

_____ No matter how much intelligence you have, you can always change it quite a bit.

Fixed mindset
A personally held belief that abilities are stable, uncontrollable, set traits.

Growth mindset
A personally held belief that abilities are unstable, controllable, and improvable.

Some of the most powerful beliefs affecting motivation in school are beliefs about intelligence and other abilities (Dweck, 2006; Gunderson et al., 2013; Headden & McKay, 2015; Romero et al., 2014; Yeager & Dweck, 2020). These beliefs range on a continuum from a **fixed mindset** that assumes that abilities are stable, uncontrollable, set traits to a **growth mindset** that suggests that abilities are unstable, controllable, and improvable. Carol Dweck has noted that students with a growth mindset believe their talents and abilities can be increased with good teaching or coaching, practice, effort, and persistence. The bottom line is that everyone can get smarter by working hard (Morehead, 2012). But not everyone has such a mindset about abilities. In fact, Dweck (2006) has found that about 40% of students hold a fixed mindset and 40% a growth mindset—the rest are in between. Look back at your answers to the *Stop & Think* questions—how would you characterize your mindset about intelligence?

Throughout the early elementary grades, most students have a growth mindset—they believe that effort is the same as intelligence. Smart people try hard, and trying hard makes you smart (Dweck, 2000; Stipek, 2002). At around age 11 or 12, children can differentiate among effort, ability, and performance. At about this time, they come to believe that someone who succeeds without working at all must be really smart and that someone who works hard all the time must not be (Muenks & Miele, 2017). This is when mindsets begin to influence motivation.

Students who hold a *fixed mindset* tend to set performance-avoidance goals to avoid looking bad in the eyes of others. They are more likely to cheat to and seek situations where they can look smart to protect their self-esteem. Like Safe Sumet, they keep doing those things they can do well without expending too much effort or risking failure because either one—working hard or failing—signifies (to them) a low level of ability that cannot be changed. To work hard but still fail would be devastating.

In contrast, holding a *growth mindset* is associated with greater motivation and learning. Students with growth mindsets tend to set moderately difficult goals, the kind we have seen are the most motivating. Believing that you can improve your ability helps you focus on the *processes* of problem solving and applying good strategies instead of on the *products* of test scores and grades (Anderman, 2021; Xu et al., 2020). In other words, effort and ability are both important for mastery (Muenks & Miele, 2017).

Ability Mindsets in the Classroom

Researchers have found considerable variation in the effects of fixed and growth mindsets on students' motivation, achievement, and mental health (Yeager & Dweck, 2020). This is because the meaning and impact of students' mindsets can depend on personal and environmental factors (as you saw in Cluster 11). The most robust finding is that students who experience academic challenges or setbacks are more negatively affected by holding a fixed mindset (Yeager et al., 2019). However, other evidence has shown that in some contexts and cultures, such as China, having a fixed mindset is not associated with students' achievement (Li & Bates, 2019). Most mindset research has asked students about their beliefs about intelligence. What about students' mindset about abilities in different areas like math, reading, dance, art, or language learning? Less research has focused on

these. For example, Elizabeth Gunderson and her colleagues (2017) found that students' math ability mindsets, but not their reading and writing mindsets, were related to their motivation and achievement.

Teachers have personal theories about ability, too, and these can be conveyed to students in strange ways. In fact, Dweck (2006) described a very powerful experience she had in sixth grade. Her teacher seated students around the room in order of their IQ scores and would not let the "lower IQ" students carry the flag, clean the erasers, or take notes to the principal—wow, what a message that effort doesn't matter! I (this is Anita) had an elementary school music teacher who not only graded us on our singing but also seated us based on our singing ability—best in front and worst in the back. I was in the back row for three years and hated that class. I was also convinced I could never improve my singing until I had a teacher in high school who encouraged growth.

Teachers who hold *fixed mindsets* about their students are quicker to form judgments and slower to modify their opinions when confronted with contradictory evidence (Stipek, 2002). Teachers who hold *growth mindsets*, in contrast, tend to set mastery goals and seek situations in which students can improve their skills because improvement means getting smarter. Failure is not devastating; it simply indicates that more work is needed. Ability is not threatened. Mindsets become the motivational climate of the classroom. Just as a healthy soil yields healthier plants, efforts to increase students' growth mindsets were more successful when students' teachers also held growth mindsets (Yeager et al., 2022). Peers' mindsets also matter. One intriguing study from the Philippines found evidence that high school students' mindsets are "contagious" to their peers. The mindsets of a student's classmates measured earlier in the year predicted the student's mindset later in the year (King, 2020).

Mindsets About Failure

Students and teachers have different responses to failure and setbacks during learning. I (Ellen writing) once taught an aspiring teacher who wrote her entire philosophy of learning on the premise that failure would not be allowed in her classroom. Failure, she believed, would be bruising to her students' self-esteem and therefore should be avoided at all costs. Unfortunately, such failure-avoiding strategies generally lead to more problems. Let's look at three approaches to failure in terms of the attributions and mindsets we have learned about.

The first approach to failure, as we just saw, might be called *failure avoidance*. From an attributional perspective, to avoid failure might mean maintaining a sense of control and stability. But students who take this approach often stick to what they know or avoid taking risks, like Safe Sumet, whom you met at the start of this cluster. Even when they are successful, if students constantly fear failure, they may have trouble developing a solid sense of self-efficacy. Their learning will suffer, and they will likely not have strong positive feelings about school.

The second approach to failure is to take a more proactive (if counterintuitive) posture to avoid failing by setting up external conditions that could be blamed if failure occurs. The aim is to protect one's self-esteem. Students who take this stance might claim not to care about their performance. They may adopt self-defeating strategies such as feeble efforts or setting very low or ridiculously high goals. Just before a test, a student might say, "I didn't study at all!" Then any grade above failing is a success. Procrastination is another example. Low grades do not imply low ability if the student can claim, "I did okay considering I didn't start the term paper until last night." All these are **self-handicapping** strategies because the students are setting up roadblocks to their own achievement to protect their self-esteem or sense of competence (Graham, 2020). They allow the individual to redirect the blame to an external cause. Very little learning is going on. Self-handicapping appears to be more damaging for achievement with elementary- and middle school–age students (Schwinger et al., 2014; Urdan, 2004).

Self-handicapping

Students' engagement in behavior that blocks their own success in order to avoid testing their true ability.

Yet a third approach is to welcome and even encourage failure during learning. Students who are not fearful of failure set moderately difficult goals, take risks, and cope

with failure constructively. They learn fast, have more self-confidence and energy, welcome concrete feedback (as long as it does not threaten them), and are eager to learn "the rules of the game" so that they can succeed. This also means that they seek help when they need it. All of these factors make for persistent, successful learning (Covington & Mueller, 2001).

Remember that the orientation students have to failure and setbacks is often modeled for them by parents and teachers. For example, Kyla Haimovitz and Carol Dweck (2016) found that fourth- and fifth-grade children whose parents held the belief that failure is debilitating (e.g., "The effects of failure are negative and should be avoided") were more likely to hold a view that intelligence is fixed. If students come to believe that failing means they are incompetent, they are likely to adopt many self-handicapping, self-defeating strategies. And teachers who stress performance, grades, and competition encourage self-handicapping without realizing they are doing so (Anderman & Anderman, 2014). Just telling students to "try harder" is not particularly effective. Students need real evidence that effort will pay off, that setting a higher goal will not lead to failure, that they can improve, and that abilities can be changed. They need authentic mastery experiences and a classroom culture that reinforces the notion that through challenge comes growth (Haimovitz & Dweck, 2017).

Attributions and Mindsets: Lessons for Teachers

If students believe they lack the ability to understand higher mathematics, they will probably act on this belief even if their actual abilities are well above average. These students are likely to have little motivation to tackle trigonometry or calculus because they expect to do poorly in these areas. How can teachers support a growth mindset (besides, of course, *not* seating your students in order of IQ test scores)? Dweck (2013) suggests the following:

- Teach students about the brain and how new connections are formed whenever you deal with difficulties and challenges and learn, retrieve, and apply knowledge. Learning changes the brain, and struggling is good! One growth mindset curriculum puts it this way: "Everyone knows that when you lift weights, your muscles get bigger and you get stronger. But most people don't know that when they practice and learn new things, parts of their brain change and get larger, a lot like the muscles do" (Headden & McKay, 2015).
- Present yourself as a learning coach and resource, not a judge of students' abilities.
- Give feedback focused on the learning process and strategies. Praise good strategies and effort rather than right answers (Park et al., 2016).
- Don't avoid criticisms, but make them constructive and focused on improvement.
- Don't comfort students by saying, "It's okay—maybe you are not just a math person." Instead say, "You just haven't mastered this strategy *yet*, but you *can*."

As you consider applying the concept of mindsets, beware of what Dweck recently described as "false growth mindset." Teachers who hold false growth mindsets may claim they believe in growth just because they know they should, but they do so without truly embracing or even understanding the concept. Many students see right through this. And those who don't see through it might receive the opposite message. For example, just praising students for working hard, even when the outcome is a failure, can lead to what Jere Brophy (1981) called "praise as a consolation prize" (p. 18). The students think they are getting praised because they really don't have the ability to do any better, so the (unintended) consequence is to reinforce a fixed mindset. Rather than praising simple effort, tie the praise to the process that leads to learning, such as a student's application of good strategies.

GUIDELINES

Encouraging a Healthy Mindset

Emphasize that abilities are not set but are always improvable.

Examples

1. Share examples of how you have improved your knowledge and skills, for example, in writing, at a sport, or doing a craft.
2. Tell about your own failures that became successes when you tried new strategies or got the right help.
3. Save first drafts and finished products from students in previous classes to show how much the students improved with effort and support.

Teach directly about the difference between learning goals and performance goals.

Examples

1. Encourage students to set a small-step goal for one subject.
2. Recognize improvements often, with private authentic praise that focuses on the processes and strategies that led to success.
3. Use personal best goals, not between-student competition.

Make the classroom a place where failure is just diagnostic—failure tells what needs to be improved, what you haven't mastered *yet*.

Examples

1. If a student gives a wrong answer in class, say, "I bet others would give that answer, too. Let's examine why that is not the best answer. This gives us a chance to dig deeper—excellent!"
2. Encourage revising, improving, polishing, and redoing with an emphasis on improvement.
3. Show students connections between their revised work and a higher grade, but emphasize their growing competence.

Encourage help seeking and help giving.

Examples

1. Teach students how to ask explicit questions about what they do not understand.
2. Recognize students who are helpful.
3. Train students to assume helping roles by assisting each other with ongoing needs (e.g., as technology guides or progress checkers).

When it comes to mindsets about ability, we once again need to *beware of either/or*. As Dweck has noted, "Everyone is a mixture of fixed and growth mindsets. You could have a predominant growth mindset in an area but there can still be things that trigger you into a fixed mindset trait" (Gross-Loh, 2016, p. 5). The real challenge for teachers and students is to identify what triggers a fixed view of ability, work on reframing this over time, and finally be able to stay in a growth mindset in a given area for longer periods. The *Guidelines: Encouraging a Healthy Mindset* on the next page provide more ideas.

What else do we know about motivation? Feelings matter.

Module 37 Summary

Goals and Goal Orientations (pp. 519–525)

What kinds of goals are the most motivating? Goals increase motivation if they are specific, moderately difficult, and attainable in the near future. How students relate to their goals in the classroom is influenced by how goals are framed. Goal structures can be competitive,

individualistic, or cooperative. Cooperative goal structures can encourage motivation and increase learning, especially for low-achieving students.

Describe mastery, performance, work-avoidant, and social goals. A mastery goal is the intention to gain knowledge and master skills, leading students to seek challenges and persist when they encounter difficulties. A performance goal is the intention to get good grades or to appear smarter or more capable than others, leading students to be preoccupied with themselves and how they appear (ego-involved learners). Students can approach or avoid these two kinds of goals—the problems are greatest with avoidance. Another kind of avoidance is evident with work-avoidant learners, who simply want to find the easiest way to handle the situation. Students with social goals can be supported or hindered in their learning, depending on the specific goal (i.e., have fun with friends or bring honor to the family).

What makes goal setting effective in the classroom? For goal setting to be effective in the classroom, students need accurate feedback about their progress toward goals, and they must commit to the goals set. Generally, students are more willing to adopt goals that seem realistic, reasonably difficult, meaningful, and validated by activities connecting them to their intrinsic interests.

Expectancives, Values, and Cost (pp. 525–527)

What are expectancy × value theories? Expectancy × value theories suggest that motivation to reach a goal is the product of our expectations for success and the value of the goal to us. If either is low, our motivation will also be low. Values have to be considered in relation to the cost of pursuing a given activity. So the strength of our motivation in a particular situation is determined by our *expectation* that we can succeed, the *value* of that success to us, and the *cost* of pursuing the goal.

What are different task values? Tasks can have attainment, intrinsic, or utility value for students. Attainment value is the importance to the student of succeeding. Intrinsic value is the enjoyment the student gets from the task. Utility value is determined by how useful the task is for reaching our short-term or long-term goals.

Attributions and Beliefs About Ability (pp. 527–533)

What are the three dimensions of attributions? According to Weiner and Graham, most of the attributed causes for successes or failures can be characterized in terms of three dimensions: locus (location of the cause internal or external to the person), stability (whether the cause stays the same or can change), and controllability (whether the person can control the cause). The greatest motivational problems arise when students attribute failures to stable, uncontrollable causes. These students may seem resigned to failure, depressed, helpless—what we generlly call "unmotivated."

How do mindsets and beliefs about ability affect motivation? When people hold a fixed mindset about ability—that is, they believe that ability is fixed—they tend to set performance goals and strive to protect themselves from failure. When they have a growth mindset and believe ability is improvable, however, they tend to set mastery goals and handle failure constructively.

What is learned helplessness, and what deficits does it cause? When people come to believe that the events and outcomes in their lives are mostly uncontrollable, they have developed learned helplessness, which is associated with three types of deficits: motivational, cognitive, and affective. Students who feel helpless will be unmotivated and reluctant to attempt work. They miss opportunities to practice and improve skills and abilities, so they develop cognitive deficits and they often suffer from affective problems such as depression, anxiety, and listlessness.

How do attitudes about failure influence motivation? Mastery-oriented students tend to value achievement and see ability as improvable, so they focus on mastery goals, take risks, and cope with failure constructively. A low sense of self-worth seems to be linked with the failure-avoiding strategies intended to protect the individual from the consequences of failure. One such strategy is self-handicapping, in which students undermine their own success to avoid testing their true ability. These strategies may seem to help in the short term but are damaging to motivation and self-esteem in the long run.

MODULE 38 Interests, Curiosity, and Emotions

Learning Objective 12.6 Describe the roles of interests, curiosity, flow, emotions, and anxiety in motivation.

How Do You Feel About Learning? Interest, Curiosity, and Emotions

Do you remember starting school? Were you curious about what might be in store, excited about your new world, interested and challenged? Many children are. But a common concern of parents and teachers is that curiosity and excitement are replaced over time by a sense of drudgery and disinterest. School becomes a job you have to do—a workplace where the work is not that interesting. In fact, interest in school decreases from elementary to high school, with boys showing greater declines than girls. Even students in the internationally top-rated high schools in Finland found school less enjoyable and valuable in their lives as they moved from ninth to eleventh grade (Wang et al., 2015). The transition to middle school is particularly linked to a decline in interest. These declines are troubling because interest is related to students' attention, grades, reading achievement, desire to set challenging goals and solve difficult problems, and depth of learning (Linnenbrink-Garcia & Patall, 2016; Renninger & Bachrach, 2015).

Tapping Interests

Stop & Think As part of your interview for a job in a large high school, the principal asks, "How would you get students interested in learning? In your teaching, how would you tap their interests?"

TWO KINDS OF INTERESTS. Interests can be *situational* (sparked by momentary environmental conditions) or *individual* (relatively enduring desire to engage one's attention). *Situational* interests are shorter-lived aspects of the activity, text, or materials that catch and keep the student's attention. *Individual* interests are the more long-lasting aspects of the person, such as an enduring tendency to enjoy subjects such as history or mathematics or activities such as music, gaming, or fashion. Students with individual interests in learning seek new information and have more positive attitudes toward schooling. Both individual and situational interests are related to learning. And interests increase when students feel competent, so even if students are not initially attracted to a subject or activity, they may develop interests as they experience success.

Ann Renninger and Suzanne Hidi (2016) have described a four-phase model of interest development.

Situational Interest is Triggered → Situational Interest is Maintained →

→ Individual Interest Emerges → Well-Developed Individual Interest is Established

Consider the interests of Julia, a graduating senior in college described by Hidi and Renninger (2006). As Julia waits nervously in the dentist's office, flipping through a magazine, her attention is drawn (*situational interest is triggered*) to an article about a man who left his engineering job to become a facilitator in legal conflict resolution. When she is called to the dentist's chair, she is still reading the article, so she marks her place and returns to finish reading after her appointment (*situational interest is maintained*). She takes notes and, over the next weeks, searches the Internet, visits the library, and meets with her advisor to get more information about this career option (*emerging individual interest*). Four years later, Julia is enjoying her job as a facilitator as she handles more and more arbitration cases for a law firm (*well-developed, enduring individual interest*).

In the early stages of this four-phase model, emotions play a big role—feelings of excitement, pleasure, fun, and curiosity. Situational interest may be triggered by positive feelings, as when Julia started reading. Curiosity followed and helped Julia stay engaged as she learned more about becoming a facilitator. As Julia added knowledge to her curiosity and positive feelings, her personal interest emerged, and the cycle of positive feelings, curiosity, and knowledge continued to build enduring interest.

CATCHING AND HOLDING INTERESTS. Whenever possible, it helps to connect academic content to students' enduring *individual* interests. But given that the content you will teach is determined by state standards in most classrooms today, it will be difficult to tailor every lesson to each student's interests. You will have to rely more on triggering and maintaining situational interest. Here, the challenge is to not only *catch* but also *hold* students' interest (Pintrich, 2003). For example, Mathew Mitchell (1993) found that using computers, groups, and puzzles caught students' interest in secondary mathematics classes, but the interests did not hold. Lessons that held the students' interest over time included math activities that were related to real-life problems and active participation in laboratory experiments and projects.

Challenge, choices, novelty, fantasy, working with others, hands-on activities and experiments, encouraging students' explanations, instructional conversations, assuming the role of an expert, personal relevance, utility value, and participating in a group project also can trigger and support interest (Renninger & Bachrach, 2015; Renninger & Hidi, 2016; Tröbst et al., 2016). Culturally relevant materials cultivate individual interest by connecting to students' lives. For example, Christopher Emdin and his colleagues (2016) implemented a hip-hop-themed science program for urban high school students who were predominantly African American or Latino and from low-income communities. Students were tasked with crafting science-based raps or spoken word poems. The semester culminated in a school-wide rap battle held at a local university. This activity enhanced both situational and individual interest in science. It also enabled students to interleave their social, emotional, and academic lives.

Initiatives like using hip-hop to enhance motivation and learning in science are a form of *personalized education*, an approach that has been shown to increase situational and individual interest (Reber et al., 2018). How can you provide personalized learning experiences for your students? One way is to incorporate activities that connect to students' individual interests outside the classroom (e.g., music, games, sports). A second way is to provide choice in what students learn or how they demonstrate their learning. A third way is to invite students to actively connect the lesson to their own lives (e.g., How does this topic relate to you or to the people or things you care about?). In short, learning that has personal meaning transcends the walls of the classroom, which can enhance and sustain students' interest (Bergin, 2016).

Remember that what works for one student or group of students might not work for others. For example, an approach that is useful for triggering interest for students who have low initial enthusiasm may not work for students who were already interested in the subject. In addition, complex materials can be more interesting than simple materials, as long as students have a growth mindset and believe they can effectively cope with the complexity (Sylvia et al., 2009). When tasks are difficult and students have lower expectations for succeeding, you can support interest by setting goals that emphasize learning. With these mastery-approach goals, difficulties and mistakes are just part of learning and building your brain (Tanaka & Murayama, 2014). Your own interests and enthusiasm can also go a long way in promoting students' interest (Lazarides et al., 2019).

There are other cautions to consider in supporting students' interests, as you can see in the *Point/Counterpoint*.

Curiosity: Novelty and Complexity

Curiosity and interest are related. A student who is interested may display the very same behaviors as a student who is curious. However, curiosity is distinct from interest in some important ways (Grossnickle, 2016; Shin & Kim, 2019). Curiosity arises when students' attention is focused on resolving uncertainty to fill a gap in their knowledge (Jirout et al., 2018), whereas interest supposes that students have an ongoing desire to engage with a topic.

POINT/COUNTERPOINT: Does Making Learning Fun Make for Good Learning?

When many beginning teachers are asked about how to motivate students, they often mention making learning fun. But is it necessary for learning to be fun?

Point

Teachers should make learning fun. When we searched "making learning fun" on Google, we found almost 2 billion hits (including a website by that very name for early childhood educators—http://makinglearningfun.com). Clearly, there is interest in making learning fun. Research shows that passages in texts that are more interesting are remembered better (Schunk et al., 2014). For example, in an international study of 15-year-olds, enjoyment of reading proved to be a strong predictor of reading achievement, for both individuals and countries, in the United States and also in 12 of the highest-performing countries—Korea, Singapore, Japan, Hong Kong, Finland, Canada, New Zealand, Australia, Germany, the United Kingdom, China, and the Netherlands (Lee, 2014).

Games and simulations can make learning more fun, too. When my (Anita's) daughter was in the eighth grade, all the students in her grade spent 3 days playing a game her teachers had designed called ULTRA. Students were divided into groups and formed their own "countries." Each country had to choose a name, symbol, national flower, and bird. They wrote and sang a national anthem and elected government officials. The teachers allocated different resources to the countries. To get all the materials needed for the completion of assigned projects, the countries had to establish trade with one another. There was a monetary system and a stock market. Students had to work with their fellow citizens to complete cooperative learning assignments. Some countries "cheated" in their trades with other nations, and this allowed debate about international relations, trust, and war. Liz says she had fun—but she also learned how to work in a group without the teacher's supervision and gained a deeper understanding of world economics and international conflicts.

Counterpoint

Fun can get in the way of learning. As far back as the early 1900s, educators warned about the dangers of focusing on fun in learning. None other than John Dewey, who wrote extensively about the role of interest in learning, cautioned that you can't make boring lessons interesting by mixing in fun like you can make bad chili good by adding some tasty, spicy hot sauce. Dewey wrote, "When things have to be made interesting, it is because interest itself is wanting. Moreover, the phrase itself is a misnomer. The thing, the object, is no more interesting than it was before" (Dewey, 1913, pp. 11–12).

There is a good deal of research indicating that adding interest by incorporating fascinating but irrelevant details actually gets in the way of learning the important information. These "seductive details," as they have been called, divert the readers' attention from the less interesting main ideas, especially if the material to be learned is complex and makes great demands on working memory (Park et al., 2015; Reber, 2016). For example, Shannon Harp and Richard Mayer (1998) used high school science texts with emotional interest and seductive details about swimmers and golfers who were injured by lightning, but these "fun" details failed to improve learning. Adding interesting but unrelated pictures to a social studies reading assignment also led to decreased learning for middle school students in China (Wang & Adesope, 2014). In all these examples, the seductive details may have disrupted students' attempts to follow the logic of the explanations and thus interfered with their comprehending the text. Harp and Mayer concluded, "The best way to help students enjoy a passage is to help them understand it" (p. 100).

Beware of Either/Or

Of course we want our classes to be engaging, interesting, even fun—but the focus through it all should be on learning. Even if the work is tough and at times repetitious, students need to learn to persevere. Working hard is a part of life. Working hard together can be fun.

Curiosity can be important, particularly at early phases of interest development (Hidi & Renninger, 2019).

When my (Ellen here) students and I were settling in for class last fall, one student, a music education major, entered a couple of minutes late carrying a large, oddly shaped instrument case. I immediately decided to use it as a teaching prop. "Wow, Seth. That case is huge! What do you all think is inside Seth's case?" Just like that, our collective curiosity was engaged (I myself did not know). We spent some time discussing the instrument's features, piecing together our hypotheses based on our collective background knowledge. I can't remember a more engaged moment for my class during the entire fall semester. As it happened, that day we were covering a topic that you learned about in Cluster 3—Piaget's concept of disequilibrium and its implications for teaching. Perfect timing—we had just entered a state of cognitive disequilibrium to name and classify this mystery instrument. This "mismatch" between what we knew and didn't know—a gap not too big but not too small—was motivating to resolve. (By the way, before showing us the instrument, Seth told us that it was a *euphonium*, which for some of us led to even more disequilibrium and schema reconstruction!) The *Guidelines: Building on Students' Interests and Curiosity* offer some strategies that you might find useful in your classroom. Notice how some of these strategies came in handy during my impromptu lesson involving Seth's musical instrument.

Your students will similarly need some base of knowledge before they can recognize gaps in that knowledge that lead to curiosity (Ainley, 2019). Asking students to make guesses and then providing feedback can be helpful. Also, proper handling of mistakes can stimulate curiosity by pointing to missing knowledge. Finally, the more we learn about a topic, the

GUIDELINES

Building on Students' Interests and Curiosity

Relate content objectives to student experiences.

Examples

1. With a teacher in another school, establish correspondence pals across the classes. Through writing letters, students exchange personal experiences, photos, drawings, and written work and ask and answer questions ("Have you learned cursive writing yet?" "What are you doing in math now?" "What are you reading?"). Letters can be mailed in a bundle or sent via email.
2. Identify and invite community experts for different assignments or tasks. Who knows how to do graphic design? How to cook? How to navigate the stock market?
3. Have a "Switch Day" when students exchange roles with a school staff member or support person. Students must research the role by interviewing their staff member, prepare for the job, dress the part for the day they take over, and then evaluate their success after the switch.

Identify student interests, hobbies, and extracurricular activities that can be incorporated into class lessons and discussions.

Examples

1. Have students design and conduct interviews to learn about each other's interests.
2. Build a class library with books that connect to students' interests, hobbies, and cultures.
3. Allow choices (stories in language arts or projects in science) based on students' interests.

Support instruction with humor, personal experiences, and anecdotes that show the human side of the content.

Examples

1. Share your own hobbies, interests, and favorites.
2. Tell students there will be a surprise visitor; then dress up as the author of a story and tell about "yourself" and your writing.
3. Use creative writing activities to trigger interest, such as crafting catchy story hooks, creating shocking (e.g., silly, grotesque) sentences and diagramming their parts of speech, or writing to an admired person who has passed away.

Use original source material with interesting content or for the purpose of critical analysis.

Examples

1. Archival letters, diaries, or photographs from a local library.
2. Darwin's notes in biology.
3. Headlines from different perspectives related to events throughout history.
4. Depictions of different social norms in television or print media.

Create surprise and curiosity.

Examples

1. Have students predict what will happen in an experiment, and then show them whether they were right or wrong.
2. Provide quotes from history, and ask students to guess who said it.
3. Use high-novelty reading materials with elements such as active/emotional verbs (*clinging* versus *walking*), unfamiliar characters (*orangutan* versus *fox*), unusual adjectives (*hairy* versus *brown*), and surprising endings (Beike & Zentall, 2012).

For more information on students' interests and motivation, see http://www.readwritethink.org and search for "interests."

more curious we may become about that subject. As Maslow (1970) predicted, fulfilling the need to know increases, not decreases, the need to know more. Curiosity has been associated with greater motivation, exploration, memory, learning, and well-being (Jirout et al., 2018).

Flow

Have you ever been "in the zone" or "lost in thought"? You may have been experiencing **flow**—a mental state in which you are fully immersed in a task with deep concentration and focused attention. When individuals are in flow, they face a highly challenging task with matching high levels of the needed skills—they are stretched but not broken. Individuals in flow experience greater enjoyment in the task, continue working without prompting, and tend to generate higher-quality, more creative products (Abuhamdeh & Csikszentmihalyi, 2012).

Flow
A mental state in which you are fully immersed in a challenging task that is accompanied by high levels of concentration and involvement.

Mihaly Csikszentmihalyi (pronounced "Me-high Cheek-sent-me-high") first identified flow in studies of artists, chess players, mountain climbers, musicians, and children at play, but then he examined flow during the activities that take most of our time—work and school. He found that flow was less common in school and more common at work, where people have clear goals and immediate feedback and can apply their skills. The lowest levels of flow for adults occurred on the weekends when there were no particular goals or structured activities except watching television or scrolling through the web (Beard, 2015; Csikszentmihalyi, 2000).

What would it look like for students and teachers to find flow in schools? David Shernoff and his colleagues (2014) noted that optimal learning environments that support flow have many of the features mentioned already in this cluster, such as activities that provide a high degree of challenge but are intrinsically satisfying and personally meaningful. In addition, activities that connect the head (intellect) and the heart (affect) through both work-like and play-like structures are optimally engaging. For example, a K–12 school in Indianapolis built part of the curriculum around each student's list of personally intriguing learning goals for the year. The curriculum also included lessons focused on big ideas or themes for all students such as "Working in Harmony." In an interview, Csikszentmihalyi pointed to the way the broader theme engaged students:

> In mathematics you learn the harmony of numbers, and the beauty of being able to manipulate numbers so they always end up in the right way in the equations, and in music you learn the harmony of sounds. In social studies you learn

> about the history of wars and peace, especially peace and how we learn to work together in Sociology. (Beard, 2015, pp. 356–357)

This school had a good balance of *differentiation* (developing individual interests) and *integration* (focusing on shared interests). Of course, if students lack the challenge or skill elements required for flow, they likely experience other emotions, such as apathy or boredom. It's time to take a closer look at the role of emotions in learning.

Emotions

How do you feel about learning? Excited, bored, curious, fearful? Today, researchers emphasize that learning is not just about the *cold cognition* of reasoning and problem solving. Learning also is influenced by emotion and mood, so *hot cognition* plays a role in learning as well (Bohn-Gettler & Rapp, 2011). One educational psychologist has argued that "emotions are the experiential glue of learning environments in the 21st century" (Graesser, 2020a). Part of this growing emphasis comes from the expanding research from neuroscience about the role of emotion in all aspects of learning.

EMOTION AND THE BODY. Although particular regions of the brain have been touted as the "seat" of our emotional lives, the entire body is involved in generating our emotions (Barrett, 2017; Immordino-Yang et al., 2019). How we sleep, what we eat, and whether our physiological needs are met all affect how we assess and deal with the challenges each day brings. **Emotions** are complex and not the same thing as *feelings*. For example, two people might feel stimulated and aroused thinking about riding a huge roller coaster, but one person gets a thrilling feeling of anticipation, while another feels panic and dread. Thus, emotion, in this case about roller coasters, is a complex phenomenon arising from the back-and-forth interplay of bodily responses (arousal, rapid heart beat, heightened blood pressure, etc.), cognitive predictions ("It will be a blast" versus "I'm going to die"), and conscious feelings (anticipation and excitement versus fear and dread) (Gluck et al., 2020). So human emotions are the outcome of physiological responses triggered by the brain, combined with interpretations of the situation and other information such as the predictions our brain makes from our past experiences and the context around us (Barrett, 2017). For instance, hearing startling sounds during an action movie might cause a brief emotional reaction, but hearing the same sounds in the middle of the night as you are walking through a dark alley could lead to stronger and more lasting emotional reactions.

Emotions
Three interrelated factors—physiological responses, behaviors, and feelings—that produce an affective response to a situation.

It should be clear from this description that some of the factors creating emotions are not really under our conscious control—something to remember when working with students in emotionally charged moments. A student's split-second and uncontrollable emotional judgment—"I sucked at this before and I am doomed to fail again"—can sabotage learning before it starts. However, building self-efficacy and a growth mindset can help students re-label that feeling of dread as a feeling of challenge and excitement (Crum et al., 2020). The same is true for teachers. Split-second emotional decisions about a student who "is just trying to make me look bad" can destroy chances for a good relationship. How could you reappraise that feeling?

These difficult-to-control aspects of our brains affect learning, attention, memory, and decision making (Scalise & Felde, 2017). Humans are more likely to pay attention to, learn about, and remember events, images, and readings that provoke emotional responses. Indeed, humans are wired to keep themselves alive and healthy by assessing rewards and threats from their environment. Whether classrooms feel emotionally safe or threatening can affect learners' ability to think and remember (cognition) and their sense of autonomy, social connectedness, and perceived competence (aspects of intrinsic motivation). At a physiological level, emotions can affect learning by changing brain dopamine levels and the speed of neural firings that influence long-term memory, and by directing attention toward one aspect of the situation (Pekrun et al., 2006). Sometimes, emotions interfere with learning by taking up attention or working memory space that could be used for learning.

In teaching, we are concerned about a particular kind of emotions—those related to achievement in school. How can we use these findings to support learning in school? Let's look at one model of achievement emotions.

ACHIEVEMENT EMOTIONS. In the past, with the exception of anxiety, emotions generally were overlooked in research on learning and motivation (Pekrun & Linnenbrink-Garcia, 2015). But as you just read, research in psychology and neuroscience has shown that emotions are both causes and consequences of learning and motivational processes. Reinhard Pekrun (2017) has provided a taxonomy of achievement emotions—the emotions related to academic activities (e.g., studying) or performances (e.g., successes or failures).

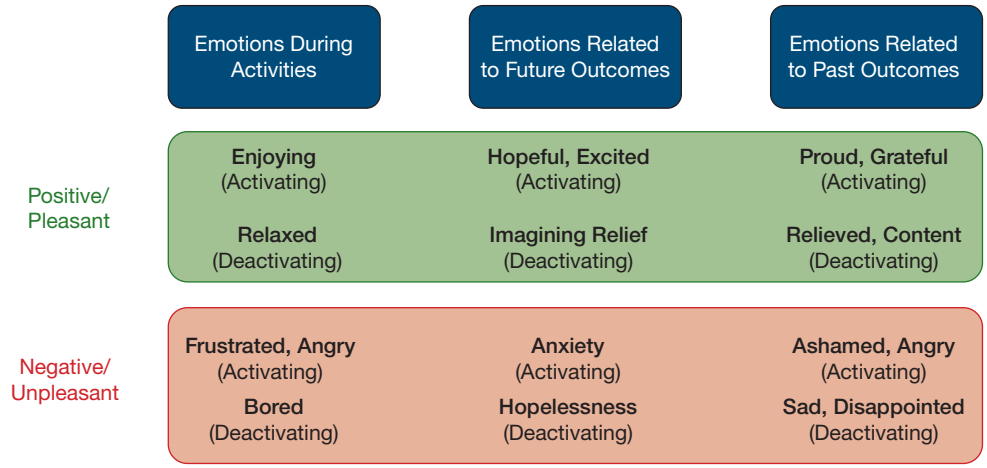
Stop & Think As you read this cluster and prepare for the class for which you are using this text, how are you feeling? What is the focus of your emotion—is it this reading activity, something that happened in class, or something that is coming up? Is your feeling generally positive or negative? How would you describe what is happening in your body? Jot down a few phrases that describe your emotional state.

Pekrun's (2018) three-dimensional classification of achievement emotions might be useful for understanding your emotions right now (see Figure 12.4). Let's start with the *object focus* of emotions. Students have emotions related to the learning activities they are doing, but they can also respond emotionally to their achievement outcomes, which can be anticipated in the future or having occurred in the past. The second dimension involves the emotional *valence*—positive/pleasant or negative/unpleasant. The third dimension is the *activation* involved in the emotional experience. Activation involves both psychological and physical reactions—changes in brain wave patterns, blood pressure, heart rate, and breathing rate. Some emotions activate our physiological systems; others, such as boredom, deactivate it.

Let's imagine a typical classroom scenario, in which you, the learner, get a sinking feeling when the teacher announces an upcoming test. The object of focus is a prospective outcome (the test), the emotional valence is negative, and the response is activating, as felt by the tension in your body. On the other hand, remembering that you earned an A on the last test might bring a sense of relief. How would you use Pekrun's taxonomy to describe your emotions right now? When positive achievement emotions are activated, students are more interested, have greater intrinsic motivation, are better at self-regulation, and learn more (Pekrun, 2017). Positive emotions that are deactivating, such as feeling relaxed, might help reinforce learning or foster creativity. When negative achievement emotions are activated, such as anxiety or

Figure 12.4 Pekrun's Taxonomy of Achievement Emotions

Pekrun's three dimensions of achievement emotions include the object focus of emotions (emotions during an activity or related to a future or past activity), emotional valence (positive or negative), and activation level (whether the emotion activates or deactivates the physiological system).



Source: Graphic created by Ellen Usher.

shame, some students become less interested in their academic work. Other students, particularly when they are highly invested in their schoolwork, become more extrinsically motivated and set performance goals to demonstrate their competence or avoid failure.

Deactivating negative emotions tend to reduce students' motivation. For example, boredom, which we feel when we are unable to pay attention or to find meaning in activities, leads to inferior learning (Westgate, 2020). Poor learning leads to being more bored as the student falls further (and hopelessly) behind (Pekrun et al., 2017). Boredom is the opposite of curiosity, which involves paying attention and making meaning. Boredom can be a big problem in school and home-based learning because it is associated with lack of intrinsic motivation, weak effort, shallow processing of information, and poor self-regulated learning (Tze et al., 2016). Strong negative or unpleasant emotions tend to get in the way of learning, whether they are activating or deactivating.

EMOTIONS IN THE CLASSROOM. Schools can be a place full of new possibilities, opportunities for diversity, curiosity, and self-discovery. On the other hand, schools can be a stressful place, characterized by peer conflict, constant evaluation by others, and pressure to achieve. What is the emotional landscape of classrooms in the United States? Over 20,000 high school students were asked to provide up to three words in response to the question "How do you feel at school?" (Moeller et al., 2020). Negative emotions were most prevalent. Nearly 40% of students said "tired," 29% "stressed," 26% "bored," and 12% "anxious." Of those expressing positive emotions, 23% said they felt "happy" and 5% said they were "excited." This pattern would likely have been different in the younger grades. These reports were made before the pandemic. Learning remotely during the pandemic was enjoyable for some and frustrating for others. The return to in-person instruction brought strong positive and negative emotional responses from students and teachers, but on average, anxiety and stress appeared to be higher for both groups (De France et al., 2021; Steiner & Woo, 2021).

How can you increase positive achievement emotions and decrease negative emotions in the subject(s) you teach? Students are more likely to experience negative emotions if they believe they (a) have little control over the learning activities and (b) don't value the activities. Matching challenge to the students' skill levels and giving choices can increase students' sense of control and flow. In addition, efforts to build interest and show the value of the activities also help foster positive emotions. Researchers tracked primary school students' sense of control and achievement values in math across three time points. As students felt more control over their math learning, they reported greater enjoyment and less boredom, but only when they also perceived math as valuable (Putwain et al., 2018).

Several points are important to keep in mind as you think about achievement emotions. First, remember that achievement emotions are domain specific. The fact that students enjoy and feel proud of their work in math does not mean they will enjoy science or history (Goetz et al., 2008; Pekrun et al., 2010, 2014). Second, some level of emotion activation can be desirable in school—even stress. Generally speaking, higher levels of arousal are helpful on simple tasks such as sorting laundry, but lower levels of arousal are better for complex tasks such as taking the SAT or GRE.

Third, emotions are contagious. Well, not exactly. But neuroscientists have shown that when social groups interact, group members' emotions become highly correlated (Saxbe et al., 2020). The emotional climate of the classroom matters. High school students whose teachers showed greater warmth and communion reported greater enjoyment and less anxiety for learning (Mainhard et al., 2018). In addition, teachers who enjoy their subjects tend to be more enthusiastic and encourage student enjoyment, so make sure that you are teaching from your own interests and passions as much as possible (Brophy, 2008; Frenzel et al., 2009; Long & Woolfolk Hoy, 2006).

Sometimes, despite our best efforts, students still seem to experience a high degree of anxiety when learning. Let's take a closer look at anxiety in the classroom.

Anxiety in the Classroom

Anxiety
General uneasiness, a feeling of tension.

One of the most frequently studied academic emotions is anxiety. At one time or another, everyone has experienced **anxiety**, or a general uneasiness, feeling of self-doubt, and sense of tension. Recent work on "academic anxieties," which is a broad term that encompasses

experiences of anxiety in educational settings, has demonstrated that many forms of anxiety—test anxiety, math anxiety, science anxiety, public speaking anxiety—can lead to patterns of beliefs and behaviors that hamper performance and promote disengagement in learning (Cassady, 2010; Hart et al., 2016; Ramirez et al., 2018). For example, math anxiety impairs math learning even among children as young as 6 years old, which can affect students' later progression in school (Tomasetto et al., 2021).

Anxiety can be both a cause and an effect of school failure—students do poorly because they are anxious, and their poor performance increases their anxiety, creating a vicious cycle for the learner. Academic anxiety has both *trait* and *state* components. So your students may have a personal level of anxiety they bring to different learning situations, and the situation itself may trigger perceptions of threat or self-doubt that add to their basic trait level of anxiety (Covington, 1992; Zeidner, 2014).

Anxiety seems to have both cognitive and affective components. The cognitive side includes worry and negative thoughts—thinking about how bad it would be to fail and worrying that you will, for example. The affective side involves physiological and emotional reactions such as sweaty palms, upset stomach, racing heartbeat, or fear (Jain & Dowson, 2009; Schunk et al., 2014). Whenever there are pressures to perform, severe consequences for failure, and competitive comparisons among students, anxiety may increase. Research with school-age children shows a relationship between the quality of sleep (how quickly and how well they sleep) and anxiety. Better-quality sleep is associated with positive arousal or an "eagerness" to learn. Poor-quality sleep, on the other hand, is related to debilitating anxiety and decreased school performance. You may have discovered these relationships for yourself in your own school career (Meijer & van den Wittenboer, 2004).

Contemporary orientations to academic anxiety suggest that anxiety affects the beliefs and behaviors of learners in three phases of the learning–testing cycle: preparation, performance, and reflection. During the *preparation* phase (classroom instruction, studying, test preparation), learners with anxiety tend to have difficulty effectively focusing attention on the relevant material, employing quality study tactics, and maintaining a positive self-worth toward the learning event. Instead of concentrating, they keep noticing the tight feelings in their chest, thinking, "I'm so tense, I'll never understand this stuff!" From the beginning, anxious students may miss much of the information they are supposed to learn because their thoughts are focused on their own worries. Regardless of whether the learner is unskilled at studying, avoiding the content due to uneasiness caused by the anxiety, or merely distracted by thoughts of the consequences of failing, the material to be learned is clearly compromised (Zeidner & Matthews, 2011). But the problems do not end here. In the *performance* phase, anxiety blocks retrieval of what was (often poorly) learned (Schwarzer & Jerusalem, 1992). Finally, in the *reflection* phase, learners with anxiety build attributions for failure that further impede their future performance by developing beliefs that they are simply incapable of succeeding at the task, determining that they have no control over the situation, and setting ineffective goals for future situations.

Reaching Every Student: Coping with Negative Emotions

Many students, including those with learning disabilities or emotional disorders or those identified as gifted or advanced, may experience negative emotions such as anxiety in school. The emotion regulation strategies you learned about in Cluster 11 will help students manage this stress. For example, when experiencing anxiety, students can use *problem-focused, self-regulating strategies* like planning a study schedule, borrowing good notes, or finding a protected place to study. Or they could use *emotion-focused strategies* by attempting to reduce the activation of negative feelings, for example, by using relaxation exercises or describing the feelings to a friend. Of course, *avoidance strategies*, like going out for pizza or suddenly launching an all-out desk-cleaning attack (can't study until you get organized!) might alleviate anxiety in the short term but can increase anxiety in the long term. Different strategies are helpful at different times and for different people and situations (Zeidner & Matthews, 2011).

What else can teachers do? First, they can help anxious learners become more effective at recognizing the source of their anxious feelings. Helping students reinterpret their

Connect and Extend to PRAXIS II®

Test Anxiety (I, C3)

Test Taking and Anxiety Go to http://www.psu.edu or http://www.osu.edu (or most college websites) and search for "test taking skills" to find tips and insights into addressing the problems associated with test anxiety. (And the tips might be useful for doing well on the PRAXIS II® exam!)

body's sensations can slowly rewire the brain to manage stressful situations more adaptively (Jamieson et al., 2016). As Lisa Feldman Barrett (2020) explains,

> A hammering heartbeat is not necessarily anxiety. Research shows that students can learn to experience their physical sensations not as anxiety but as energized determination, and when they do, they perform better on tests. That determination seeds their brains to predict differently in the future so they can get their butterflies flying in formation. (pp. 78–79)

The *Guidelines: Coping with Test Anxiety* give more strategies for helping students cope with this common source of anxiety. Similarly, teachers can help students adopt attributional styles that allow them to feel a greater sense of control over their learning and performance. So, rather than developing a failure-accepting view, students can learn to identify situations where they have been successful and recognize that with support and effort, they can achieve better outcomes.

Second, teachers can help highly anxious students set realistic goals because these individuals often have difficulty making wise choices. They tend to select either extremely difficult or extremely easy tasks. In the first case, they are likely to fail, which will increase their sense of hopelessness and anxiety about school. In the second case, they will probably succeed on the easy tasks, but they will miss the sense of satisfaction that could encourage greater effort and ease their fears about schoolwork. Goal cards, progress charts, or goal-planning journals may help here (Jain & Dowson, 2009).

Third, teachers can support improved performance by teaching students more effective methods for learning and studying. Research on anxious learners indicates that they tend to

GUIDELINES

Coping With Test Anxiety

Make sure all instructions are clear. Uncertainty can lead to anxiety.

Examples

1. Write test instructions on the board or on the test itself instead of giving them orally.
2. Check with students to make sure they understand. Ask several students how they would do the first question, exercise, or sample question on a test. Correct any misconceptions.
3. If you are using a new format or starting a new type of task, give students examples or models to show how it is done.

Avoid unnecessary time pressures.

Examples

1. Give occasional take-home tests.
2. Make sure all students can complete classroom tests within the period given.

Remove some of the pressures from major tests and exams.

Examples

1. Teach test-taking skills; give practice tests; provide study guides.
2. Provide numerous assessment opportunities to avoid weighing grades heavily on one test.
3. Teach for mastery, allowing opportunities for students to correct their errors for some credit.
4. Use variety in test items because some students have difficulty with particular formats.

Develop alternatives to written tests.

Examples

1. Try oral, open-book, or group tests.
2. Include options within tests on which students can demonstrate their understanding (e.g., answer one of several essay prompts).
3. Have students do projects, organize portfolios of their work, make oral presentations, or create a finished product.

Teach students self-regulation strategies.

Examples

1. Before the test: Encourage students to see the test as an important and challenging task that they have the capabilities to prepare for.
2. During the test: Remind students that the test is one of many opportunities to show what they know. Encourage task focus—pick out the main idea in the question, slow down, stay relaxed. Help students reframe their bodily response in ways that energize them.
3. After the test: Think back on what went well and what could be improved. Focus on controllable attributions—study strategies, effort, careful reading of questions, relaxation strategies.

For more information about academic anxiety, search the websites at most colleges and universities. For example, go to the website of The Ohio State University, and search for "test anxiety." Klee et al. (2021) also provide a set of strategies for helping high school students cope with anxiety in math.

spend more time studying, but the methods they adopt tend to be repetitive and low quality (Cassady, 2004). As teachers help students build both the cognitive and emotional skills necessary to overcome anxiety, the students should begin to observe the steady gains in performance and ideally internalize the strategies that have helped them be more successful.

Finally, teachers can limit the environmental triggers of anxiety in their classrooms. They can examine their underlying biases to reduce the presence of stereotype threat messages in their classrooms, promote mastery-oriented classroom goal structures, and provide positive role models who show interest in the content. They can also frame assignments as feasible (rather than start off with statements such as "This is *really* hard stuff"). Also, when teachers are "stressed out" about accountability and statewide testing, they can transmit this anxiety to their students. The more teachers are visibly distressed or continually emphasize "how important this test is," the more students might view testing as a threatening condition, prompting negative emotions and activating test anxiety.

Interest, Curiosity, and Emotions: Lessons for Teachers

Make efforts to keep the level of emotion activation right for the task at hand. If students are sleepy, energize them by introducing variety, piquing their curiosity, surprising them, or giving them a brief chance to be physically active. Learn about their personal interests, and incorporate these into lessons and assignments. If negative emotions like anxiety seem too great, follow the previous suggestions. Support learners' self-efficacy following the strategies you learned about in this cluster and in Cluster 11. When students perceive this kind of support from their teachers, they enjoy learning even more (Goetz et al., 2020).

We have shared a lot of information in this cluster about motivation and emotion. How can we put it all together to help you and your fellow teachers create environments, situations, and relationships that encourage motivation in the classroom? We address these questions next.

Module 38 Summary

How Do You Feel About Learning? Interest, Curiosity, and Emotions (pp. 535–545)

How do interests and emotions affect learning? Learning and information processing are influenced by emotion. Students are more likely to pay attention to, learn from, and remember events, images, and readings that provoke emotional responses or that are related to their personal interests. However, there are cautions in responding to students' interests. "Seductive details," interesting bits of information that are not central to the learning, can hinder learning.

How does curiosity affect learning, and what can teachers do to stimulate curiosity in their subject area? Curiosity can be a powerful motivational tool that captures and maintains students' attention in school. Teachers can foster curiosity by tapping into students' interests, illustrating

connections between course material and applications that may be interesting to students, and allowing students to find these connections for themselves. An example might include asking students to identify the simple machines at work in a skateboard or roller coaster.

What is flow? Flow is a mental state in which you are fully immersed in a challenging task that is accompanied by high levels of concentration and focused attention. When individuals are in flow, they face this highly challenging task with matching high levels of the needed skills—they are stretched but not broken. Individuals in flow experience greater enjoyment in the task, continue working without prompting, and tend to generate higher-quality, more creative products.

What are the dimensions of achievement emotions in learning? According to Pekrun's taxonomy of achievement emotions, students experience emotions on three dimensions. The object focus dimension refers to whether the emotions are related to the activity, or to the outcomes of the activity, whether in the future or in the past. The valence dimension refers to whether the emotions are positive or negative. The activation dimension refers to physiological arousal of the emotional event. Anger and anxiety are examples of activating emotions; relief or hopelessness are deactivating.

How does anxiety interfere with learning? Anxiety can be the cause or the result of poor performance; it can interfere with attention to, learning of, and retrieval of information. Many anxious students need help developing effective test-taking and study skills.

MODULE 39 Supporting Students' Motivation to Learn

Learning Objective 12.7 Explain how teachers can influence and encourage students' motivation to learn.

Strategies to Encourage Motivation to Learn

Motivation to learn
The tendency to find academic activities meaningful and worthwhile and to try to benefit from them.

Teachers are concerned about developing a particular kind of motivation in their students—the **motivation to learn**, defined as valuing academic activities and trying persistently to get benefit from them (Brophy, 1988, 2008). Motivation to learn involves more than wanting or intending to learn. It includes the *quality* of the student's mental efforts. For example, reading this text 11 times may indicate persistence, but motivation to learn implies that you are engaging more thoughtful, active study strategies, such as summarizing, elaborating the basic ideas, outlining in your own words, drawing graphs of the key relationships, and so on.

It would be wonderful if all our students came to us filled with the motivation to learn, but they don't. As teachers, we have two major goals. The *immediate goal* is to get students productively engaged with the work of the class; in other words, catch their interest and create a state of motivation to learn. Engagement actually increases motivation, which leads to more learning, and learning leads to greater motivation, and on and on (Reeve & Lee, 2014). A *longer-term goal* is to develop in our students a more enduring form of motivation based on their individual interests and an underlying sense of personal agency. This will mean they are able to educate themselves for the rest of their lives.

How can you accomplish these goals in your classroom? You already have the knowledge needed, based on what we have discussed about students' fundamental needs; autonomy and choice; clear, specific, mastery goals; expectations for success and growth mindsets; valuing learning tasks; self-beliefs about efficacy and controllable causes of achievement; and emotions that support learning. Table 12.3 shows how each of these components contributes to students' motivation to learn. With this knowledge in mind, what are some strategies that you can use to increase motivation to learn? It might be helpful to think of your support in response to five motivational questions students often ask: Why am I learning this? Do I like school and find it important, useful, and relevant? Will I enjoy this? Can I do what it takes to succeed? Do I belong in this classroom? (Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Eccles & Wigfield, 1985; Turner et al., 2014).

Table 12.3 The Building Blocks of Students' Motivation to Learn

Motivation to learn is built on the following components. Certain characteristics related to each component increase motivation, whereas others lower it.

MOTIVATIONAL COMPONENT	CHARACTERISTICS THAT ENHANCE MOTIVATION TO LEARN	CHARACTERISTICS THAT DIMINISH MOTIVATION TO LEARN
Source	**Intrinsic:** Personal factors such as needs, interests, curiosity, enjoyment	**Extrinsic:** Environmental factors such as rewards, social pressure, punishment
Needs and Self-Determination	**Support self-actualization and self-determination:** Fundamental needs (safety, security, belonging, competence) are met. Autonomy and appropriate choice are supported.	**Undermine self-actualization and self-determination:** Classroom is unsafe, basic needs are unmet (hungry, fearful); few opportunities for choice; little meaningful social connection.
Goals	**Clear, specific mastery and performance-approach goals:** Tendency to choose moderately difficult and challenging goals; personal satisfaction in meeting challenges and improving; concerned with mastering the task; little fear of failure	**Mastery and performance avoidance goals:** Tendency to choose very easy or very difficult vague goals; fear of failing and looking incompetent
Expectancies, Values, and Costs	**Positive:** High expectancy for success. Tasks have meaning, relevance, importance; costs of learning are reasonable.	**Negative:** Low expectancy for success. Tasks have no clear relevance and seem trivial or of little use; costs of learning are high.
Self-Efficacy and Self-Concept	**High perceived competence:** Clear evidence of personal mastery, successful models to emulate, growth mindset, adaptive strategies, supportive feedback, positive emotions, joy, challenge	**Low perceived competence:** Few successes, fear of failure. Self-handicapping strategies, learned helplessness, goals too easy or too hard, fixed mindset, depression, hopelessness
Attributions	**Stable, controllable:** Successes and failures attributed to effort, persistence, applying correct strategies, studying right (or wrong) material, growth mindset	**Unstable, uncontrollable:** Successes and failures attributed to luck, fixed ability, difficulty of task, unfair teacher
Mindset About Ability	**Growth mindset:** Belief in ability to develop through learning and sustained effort in challenging tasks. Effort brings growth and change.	**Fixed mindset:** Belief that abilities are limited and cannot change with effort. Learned helplessness. Effort indicates low ability.
Interests and Emotions	**Positive:** Curiosity piqued, tasks linked to personal and situational interests, low anxiety and pressure for performance, skill level aligns with level of challenge	**Negative:** Inability to pay attention, tasks have little meaning. High stress, frustration. Tasks are too easy or too hard compared to skill level. Lack of sustained interest and little curiosity.

Why Am I Learning This? Is It Valuable, Useful, Relevant?

Jere Brophy (2008) reminded teachers that learning is valuable: "Powerful ideas expand and enrich the quality of students' subjective lives" (p. 140). These ideas give us lenses for viewing the world, tools for making decisions, and frames for appreciating the beauty in words and images. An entire issue of *Theory Into Practice* is devoted to Jere's ideas about engaging students in the "why" of learning (Turner et al., 2011). One way to demonstrate value and build appreciation is with authentic tasks.

CREATING AUTHENTIC TASKS. If you ask students to memorize definitions they will never use, to learn the material only because it is on the test, or to repeat work they already understand, then there can be little motivation to learn. But if the tasks are connected to current and future real-life problems, students are more likely to see the genuine utility value of the work and are also more likely to find the tasks meaningful and interesting (Pugh & Phillips, 2011). An **authentic task** relates to students' lives and requires them to use the tools of the discipline they are studying (say, biology or history) to solve a problem. Solving the authentic problem immerses the students in the culture of the discipline and connects it with their lives (Belland et al., 2013). For example, a physics teacher might use skateboarding as a basis for problems and examples, knowing that skateboarding is an authentic task for many of her students.

Authentic task
Tasks that have some connection to real-life problems the students will face outside the classroom.

INCREASING PERCEIVED RELEVANCE AND UTILITY. Sometimes activities may lack intrinsically interesting qualities despite their relevance to students' academic skill development

or life outside school. In such cases, helping students see the usefulness or "instrumental" value of tasks is necessary.

1. When these connections are not obvious, you should *explain the connections* to your students or, even better, support their autonomy by asking them to choose a way to explain how the material will be important in their lives (Rosenzweig et al., 2019).
2. In some situations, teachers can *provide incentives and rewards* for learning (see Cluster 7). Remember, though, that giving rewards when students are already interested in the activity may undermine intrinsic motivation (Hidi, 2016).
3. *Use ill-structured, real-world problems* in teaching. Connect problems in school to real problems in life and the broader society, such as buying your first car, making decisions about mobile phone plans, or writing a persuasive letter to a lawmaker.
4. Invite students to think about how what they are learning is connected to their *self-interests and communities*. Ask students to show how a task might be personally beneficial or meaningful to others in the community (Priniski et al., 2019). Provide opportunities to share learning with community members.

Will I Enjoy This?

We want students to see the value of the tasks they perform. We want them to work to learn, not just try to get the grade or get finished. But we also want them to enjoy the process—to be curious and engaged as they make choices and invest effort.

ENHANCING CURIOSITY, INTEREST, AND INTRINSIC VALUE. Let's examine several strategies for encouraging students' intrinsic value and interest (Brophy, 1988).

1. *Tie class activities to student interests* in sports, music, current events, pets, common problems or conflicts with family and friends, social movements, fads, television and movie personalities, or other significant features of their lives (Reber et al., 2018).
2. *Arouse curiosity.* Point out puzzling discrepancies between students' beliefs and the facts. For example, Stipek (2002) described a teacher who asked her fifth-grade class if there were "people" on some of the other planets. When the students said yes, the teacher asked if people needed oxygen to breathe. Because the students had just learned this fact, they responded yes. Then the teacher told them that there is no oxygen in the atmosphere of the other planets. This surprising discrepancy between what the children knew about oxygen and what they believed about life on other planets led to a rousing discussion of the atmospheres of other planets.
3. *Make the learning task fun.* Many lessons can be taught through appropriately used but still fun simulations or games (see the *Point/Counterpoint* on page 537).
4. *Make use of novelty and familiarity.* Don't overuse a few teaching approaches or motivational strategies. We all need some variety. Varying the goal structures of tasks (cooperative, competitive, individualistic) can help. When the material being covered in class is abstract or unfamiliar to students, try connecting it to something they know and understand. For example, talk about the size of a large area, such as the Acropolis in Athens, in terms of football fields.

SUPPORTING AUTONOMY. Children and adolescents spend literally thousands of hours in schools where other people decide what will happen. Yet we know that self-determination and a sense of internal locus of causality are critical to maintaining intrinsic motivation and engagement (Jang et al., 2010; Reeve, 2018). To support students' autonomy, consider providing a range of selections and allowing students to pick an option that is important and relevant to them (Katz & Assor, 2007). But beware of giving too many choices. Like totally unguided discovery or aimless discussions, unstructured or unguided choices can be counterproductive for learning (Patall & Hooper, 2019). The alternative is *bounded choice*—giving students a range of options that set valuable tasks for them but also allowing them to follow personal interests. Students can have input about work partners, seating arrangements, how to demonstrate their knowledge, or what to read.

Can I Do It? Building Confidence and Positive Expectations

We want students to have confidence in their ability so they will approach learning with energy, enthusiasm, and an expectation for success. But no amount of encouragement or "cheerleading" will substitute for real accomplishment. To ensure genuine progress:

1. *Begin work at the students' level, and move in small steps.* One possibility is to have very easy and very difficult questions on every test and assignment so all students are both successful and challenged. When grades are required, make sure all the students in class have a chance to make at least a C if they work hard.
2. *Make sure students' learning goals are clear, specific, and possible to reach in the near future.* Break long-term projects into subgoals. If possible, give students a range of goals at different levels of difficulty, and let them choose.
3. *Emphasize self-comparison, not comparison with others.* Give specific feedback and corrections. Tell students what they are doing right as well as what is wrong and why it is wrong. Periodically, give students a question or problem that was once hard for them but now seems easy. Point out how much progress they have made.
4. *Communicate to students that academic ability is improvable and specific to the task at hand.* In other words, the fact that a student has trouble in algebra doesn't necessarily mean that geometry will be difficult. Don't undermine your efforts to stress improvement by displaying only the papers that earned the highest marks on the bulletin board.
5. *Model good problem solving, especially when you have to try several approaches.* Students need to see that learning is not smooth and error free, even for the teacher.

What Do I Need to Do to Succeed? Providing Structures That Support Progress

We want students to believe that success will come when they apply good learning strategies instead of believing that their only option is to use self-defeating, failure-avoiding, face-saving strategies. When things get difficult, we want them to stay focused on the task and not "freeze" from fear of failure (Klee et al., 2021). Classroom structures can help students make steady progress.

1. *Give students frequent opportunities to respond* through questions and answers, short assignments, or demonstrations of skills and correct problems quickly. You don't want students to practice errors too long.
2. When possible, *have students create a finished product.* They will be more persistent and focused on the task when the end is in sight. For example, I (Anita) often begin a house-painting project thinking I will work for just an hour and then find myself still painting hours later because I want to see the finished product.
3. *Avoid heavy emphasis on grades and competition.* An emphasis on grades forces students to focus on performance, not learning. Anxious students are especially hard hit by highly competitive evaluation.
4. *Reduce the task risk without oversimplifying it.* When tasks are risky (failure is likely and the consequences of failing are grave), student motivation suffers. For difficult, complex, or ambiguous tasks, provide students with plenty of time, support, resources, and help and the chance to revise or improve work.
5. *Model motivation to learn* for your students. Talk about your interest in the subject and how you deal with difficult learning tasks (Xu et al., 2012).
6. *Teach the particular learning strategies* that students will need to master the material being studied. Show students how to learn and remember so they won't fall back on self-defeating strategies or rote memory.
7. *Be aware of situations and communications that increase anxiety*; teach students strategies for coping with anxiety in learning and testing.

Do I Belong in This Classroom? Creating Inclusive Opportunities

We want students to feel as though they belong in school—that their teachers and classmates care about them and can be trusted. Feeling accepted and respected by others goes a long way in enhancing motivation and well-being. Remember that students differ in terms of language, culture, economic privilege, personality, knowledge, experience, and social identity. Their needs, goals, interests, beliefs, and emotions will also develop differently according to their sociocultural contexts (Nolen, 2020). Teachers support students' motivation by understanding that students' motives do not work in isolation from their lived experiences. People's lives, like their motivation, involve complex systems of meaning. Consider this reflection by one of my (Ellen's) former students, Saira Matthews, about her high school English teacher.

> As an adolescent, I found the best learning environment for me to be my AP American Literature class. While every other English class I had taken prior to this 11th grade class had pre-selected materials, Mrs. Smith offered a lot more fluidity in our choice of readings. It was the first time I was able to read literature by or about Black people that had nothing to do with slavery. Mrs. Smith gave us guidelines for our papers and projects, but what we read was completely up to us. Not only did this class open my eyes to writers such as Toni Morrison and Maya Angelou, it made me feel really competent as a reader. It also inspired me to start writing more for pleasure rather than just to turn in assignments. Seeing myself in literature and being able to discuss nuances of African American culture beyond slavery was crucial in building my confidence as a writer, which is now an important aspect of me as a graduate student.

Notice that Mrs. Smith's openness to support Saira's autonomy as a reader led Saira to choose books by Black authors whose experiences resonated with her own identity. This raised Saira's interest in reading, she felt more competent, and she felt culturally connected in her class. These shifts in her values and beliefs led to a change in her goal orientation toward writing. This is an example of how opportunity structures can support students' motivation and belonging in school (Gray et al., 2018).

Let's take a look at several research-based strategies for creating belonging-supportive learning environments outlined by Kaleen Healey and Chloe Stroman (2021, pp. 1–2). As you will see, many touch on what was happening in Mrs. Smith's classroom.

1. *Respect each student's identity along multiple dimensions* so that every student feels understood and known as a person and thinker in the environment. (You can find specific strategies for how to do this in Cluster 2.)
2. *Affirm each student's capacity to succeed* in the environment by combining high expectations with the feedback and support needed to meet them.
3. *Recognize each student's agency and contributions* to the classroom, institution, community, and society.
4. *Challenge exclusion and promote inclusion* by paying attention to the practices, policies, and norms that may send signals to students about whether they belong. For example, you can work to increase access to learning environments that are accelerated and eliminate practices that inequitably exclude students (e.g., disciplinary sanctions).
5. Use *instructional resources and pedagogy* that counter negative stereotypes and create cultural continuity via instructional activities that draw on students' experiences, use collaboration and exploration, and are relevant for communal goals. The *Guidelines: Family and Community Partnerships* offer some strategies for outreach to families that could enhance students' motivation by connecting learning activities to their lived experiences outside of school.
6. Attend to *system-level policies and practices* to communicate respect and support for every student, ensure the equitable use of resources and access to information, and engage students in system-level decision making.

Creating a supportive environment is not only motivating, it is fundamental to good teaching. That's why we have devoted a large part of Cluster 13 to it.

GUIDELINES

Family and Community Partnerships

Supporting the Sociocultural Foundations of Motivation

Understand family goals for children.

Examples

1. In an informal setting, around coffee or snacks, meet with families individually or in small groups to listen to their goals for their children.
2. Send out questionnaires electronically or via response cards sent home with students asking what skills the families believe their children most need to work on. Pick one goal for each child, and develop a plan for working toward the goal both inside and outside school. Share the plan with the families, and ask for feedback.

Identify student and family interests that can be related to goals.

Examples

1. Ask a member of the family to share a skill or hobby.
2. Identify "family favorites"—favorite foods, music, vacations, sports, activities, hymns, movies, games, snacks, recipes, memories. Tie class lessons to interests.

Give families a way to track progress toward goals.

Examples

1. Provide simple "progress charts" or goal cards that can be posted on the refrigerator.
2. Ask for parents' or caregivers' feedback (and mean it) about your effectiveness in helping their children.

Work with families to build confidence and positive expectations.

Examples

1. Avoid comparing one child in a family to another during conferences and discussions with family members.
2. Ask family members to highlight strong points of homework assignments. They might attach a note to assignments describing the three best aspects of the work and one element that could be improved.

Make families partners in showing the value of learning.

Examples

1. Invite family members to the class to demonstrate how they use mathematics or writing in their work.
2. Involve parents or caregivers in identifying skills and knowledge that could be applied at home and prove helpful to the family right now, for example, keeping records on home expenditures, writing letters to service providers, or researching vacation destinations.

Provide resources that build skill and will for families.

Examples

1. Give family members simple strategies for helping their children improve study skills.
2. Involve older students in a "homework hotline" network for helping younger students.

Have frequent celebrations of learning.

Examples

1. Invite families to a "museum" at the end of a unit on dinosaurs. Students create the museum in the auditorium, library, or cafeteria. After visiting the museum, families go to the classroom to examine their child's portfolio for the unit.
2. Place mini-exhibits of student work at local grocery stores, libraries, or community centers.

Module 39 Summary

Strategies to Encourage Motivation to Learn (pp. 546–551)

Define motivation to learn. Teachers are interested in a particular kind of motivation—student motivation to learn. Student motivation to learn involves taking academic work seriously, trying to get the most from it, and applying appropriate learning strategies in the process.

How can teachers support autonomy and authenticity? To be optimally motivating, the tasks that teachers ask students to perform should be authentic and should support students' self-determination. Connecting to students' interests and providing choice enhance both authenticity and autonomy. Like totally unguided discovery or aimless discussions, unstructured or unbounded choices can be counterproductive for learning. Teachers can support autonomy by providing bounded choices—a range of options that set out valuable tasks for them but also allow them to follow personal interests. The balance must be just right so that students are not bewildered by too much choice or bored by too little room to explore.

How can teachers support value, interest, and positive emotions? When students encounter tasks that are related to their interests, stimulate their curiosity, or are connected to real-life situations, they are more likely to be motivated to learn. Tasks can have attainment, intrinsic, or utility value for students. Attainment value is the importance to the student of succeeding. Intrinsic value is the enjoyment the student gets from the task. Utility value is determined by how much the task contributes to reaching short-term or long-term goals.

How can teachers support self-efficacy and expectancies for success? Setting goals that are manageable and helping students see their progress toward their goals can support self-efficacy and expectancies. Goals that are clear, specific, and short term are most motivating. Emphasizing self-comparison rather than peer comparison helps to build a sense of mastery. Teachers can also model problem-solving strategies and persistence.

What structures are most helpful for maintaining students' engagement and progress? Frequent and diverse assessments help students demonstrate their skill development in ways that engage their interest and reduce boredom. Anxiety can be reduced by focusing goals on learning rather than performance and lowering the risks involved in tasks.

What can teachers do to help students feel like they belong? Belonging and relatedness are central to motivation. Assignments that show respect and support for students' identity development, affirm students' ability to succeed, value students' personal contributions, are culturally relevant, and are anti-racist are part of a supportive and welcoming learning environment.

Cluster 12 Review

Key Terms

Amotivation
Anxiety
Attribution theories
Authentic task
Being needs
Deficiency needs
Emotions
Expectancy for success
Expectancy × value theories
Extrinsic motivation
Fixed mindset
Flow
Goal orientations
Growth mindset
Hierarchy of needs
Importance or attainment value
Incentive
Interest or intrinsic value
Intrinsic motivation
Learned helplessness
Locus of causality
Mastery goal
Motivation
Motivation to learn
Need for autonomy
Need for competence
Need for relatedness
Performance goal
Self-actualization
Self-efficacy
Self-handicapping
Social goals
Utility value
Value
Work-avoidant learners

Connect and Extend to Licensure

Multiple-Choice Questions

1. Miss Johnson would like her students to be motivated to do their work without bribing them with treats or promises of extra recess time. Which one of the following is the type of motivation she should encourage in her students?
   - **A.** Extrinsic
   - **B.** Intrinsic
   - **C.** Locus of control
   - **D.** Relatedness
2. Why should educators concern themselves with Abraham Maslow's hierarchy of needs?
   - **A.** The stages in students' development might determine their ability to be successful in certain subjects.
   - **B.** Social and emotional growth can impact students in their ability to cooperate with their peers.
   - **C.** Deficiencies in students' lives can impact their ability to succeed academically.
   - **D.** Parenting styles determine whether or not students succeed academically.
3. Teachers who select all content for their students and insist on students accomplishing their assignments on their own neglect which of the following aspects of self-determination?
   - **A.** Autonomy and competence
   - **B.** Autonomy and relatedness
   - **C.** Relatedness and competence
   - **D.** Autonomy, relatedness, and competence
4. Which of the following is true regarding extrinsic motivation?
   - **A.** Extrinsic motivation should be avoided at all costs because it undermines a student's intrinsic desire.
   - **B.** Extrinsic motivation is not associated with grades and incentives.
   - **C.** Extrinsic motivation may be necessary to initially encourage students to engage in certain activities.
   - **D.** Extrinsic motivation is more desirable than intrinsic motivation in the classroom because educators have increased control.

Constructed-Response Questions

Case

Stephanie Wilson had been educated in "old school methods." Her teachers insisted on straight rows of seated students who did not talk during lectures or complain about assignments. While Stephanie had been successful in this model, not all of her past classmates had flourished in such a rigid environment. As a new teacher, she wanted a more student-friendly environment. She envisioned a classroom where students were stimulated by the activities and worked collaboratively. "I want my students to look forward to coming to school. I want them to be agents in the learning process, not just passive recipients of my curriculum." She imagined designing learning situations in which her students could all achieve. Step-by-step, they could all learn! As her students would progress, she would see when they got off the track and manage to remediate before they started to do poorly. In this way, Stephanie thought, none of her students would be failures.

5. Explain why Stephanie's plan to provide early remediation when students are struggling is a good idea.
6. How can Stephanie support self-determination and autonomy in her classroom?

What Would They Do?

Teachers' Casebook: Motivating Students When Resources Are Thin

At the beginning of this cluster, we asked you to think critically about how you would motivate students when school resources are thin. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Maria Soisson • 6th-Grade Math Teacher
Walnut Springs Middle School, Westerville, OH

The question of motivation is one that educators work to solve on a daily basis. Secondary teachers have specialized in a subject and want to share their excitement and curiosity with students. In the case presented, the teacher is given seemingly dry and boring material. While the year may be outlined by the required units, this is a great opportunity to be creative with the standards! I would use the workbooks as a guide for the order in which to teach the standards as well as a potential practice set. From there, the way I present the material in class will evolve as I get to know my students and their interests. I will take what I learn about them and find ways to connect the standards to the topics about which they are passionate. Building connections with students creates a sense of mutual respect and obligation which, in turn, will make both me and my students work harder for each other.

Vanessa Sauer • 2nd- and 3rd-Grade Teacher
Royal Heights Elementary School, Vancouver, British Columbia, Canada

Textbooks, especially those that look outdated, scream both "overwhelming" and "boring." I would say use the textbooks and limited resources available as guidelines for your big ideas.

Pull out what the big ideas are and learning objectives for the year. Focus on a variety of teaching strategies in order to develop students' understanding, such as using pictures for brainstorming or gathering prior knowledge, bringing snippets of text to focus in on and have students respond to, or integrating cross curricular subject areas such as drama and music as assessment for learning. Use games to make it fun and light. Evoke students' imaginations and personal lived experiences, making the content relevant to their lives through story. Sharing your own stories and modelling vulnerability builds community and trust. When teaching is approached through a lens of curiosity and wonder, the learning has no boundaries and sets a natural tone of inquiry-based learning. Students and teachers learn throughout the process from and with each other. Show that you are learning from what students have to say. Have fun with the freedom and autonomy you have as a teacher to be creative and think outside of the box. If you find it fun and interesting, they will too! Don't forget to collaborate with other teachers. Your colleagues are professional educators and from them there is a lot to be learned. Oh right, and there's also the Internet.

Ashley Richardson • Middle School English/Language Arts Teacher

Lansing Charter Academy, Lansing, MI

I would look at the years the materials were published and would consider not using them if they were more than 25 years old. There may be some ideas and skills that are relevant, but we have a myriad of resources that have been made available to teachers, and I would want to use current texts to get my students to the levels they need to be at to be successful global citizens. I would keep the learning objectives and their order and find supplemental texts that support the objectives that will not be as intimidating. I would still keep the difficult texts to use for mini-lessons on annotating and scanning for main ideas. The school's culture and the history of student success is one of the first observations I make when starting at a new school. Some schools celebrate their scholars, and they are driven by their competition with each other to be the best. Other schools may consider the scholars "over-achievers" or "nerds," whereas others prioritize sports over academics. I would need to assess students' personal levels of accountability when given difficult tasks and easier tasks. On the first day of school, I have students write a letter to introduce themselves to me. I can assess their writing style and their work ethic if the letter is thoughtful and has length. It's also minimal risk in getting wrong answers to just talk about yourself, so I usually get a 90% return rate. That way, it is only a few students who didn't turn the assignment, and I can pinpoint their history of completing work and participating in class. I use instruction to drive my discipline and motivation.

Melissa Cho • 3rd- and 4th-Grade Teacher

Royal Heights Elementary School, Surrey, British Columbia, Canada

In education, it is important to be resourceful and utilize materials available to you. Regardless of the quality do not be quick to discard them until you have reviewed them, as you may be able to pull helpful pieces of information and ideas from them. Remember that you do not need to reinvent the wheel and to use materials available to you. I have always used and skimmed textbooks for my own knowledge to learn the content included. I will pull the important aspects and use them as my key teachings. If the content is too difficult for learners, I will try to find anchor books (picture books) to help hook my learners and engage them in the topic at hand. With learning goals, it is important to always plan student centered activities and have their best interest in mind. Engaging the five senses is important and utilizing information to teach key learning goals can be done through discussion, hands on activities, role play and independent reflections. Having a variety of activities planned that target a learning goal will help meet the needs of all individual learners' preferences. Providing learners with choice is also an important aspect of in class and remote learning. It is important to understand and know your learners on an individual and whole group level in order to plan activities that engage all learners. Knowing your learners' strengths and challenges is necessary in order to help set them up for success.

Melodi Sterner • 6th- and 7th-Grade Teacher

Riverwatch Middle School, Suwanee, GA

Learning in the classroom does not happen because of materials and textbooks. Learning also does not NOT happen because of the lack thereof. This was one of the first things I had to learn right out of college as I embarked on my first teaching assignment. What makes learning in the classroom happen is relationships. The first task is to embark on learning your community and learning your students. Asking questions like "What are they interested in these days? What is important to them?" Talking with all the students, every day, about the things they are interested in, and using their names, is the first step in having any learning happen in the room. With limited resources, you get creative as a teacher. Build your own presentations. Start the lessons each day with something that they can relate to, talk about, feel successful with, then ease that into the day's lesson. Students want to be told the truth. Telling them WHY they are learning what they are learning and WHAT may be difficult goes a long way. Having conversations about learning makes a difference with kids. If the resources that you are given are not on level with the students, talk about that. Ask them what they may need to be successful. Involve the students in the learning process but be real about it. I have found that motivation in learning simply starts with treating each student as a real person and giving that individual the opportunity to make the decisions about learning. This encourages a growth mindset. When students feel safe to learn, they learn. Have the students help create better ways to get the information. Help generate ideas such as "We should underline words that we don't know as we hit them in our texts. Then work together to find the meaning." Giving students the power to overcome adversity gives them wings in their learning. Kids will fight and overcome any obstacle with you, if you just form relationships first.

Marianne Robinson • 4th- through 7th-Grade Teacher
Meadowbrook Elementary School & Scott Cree Middle School, Coquitlam, British Columbia, Canada

In terms of the texts and workbooks, I would let the content of the material guide the focus of the unit to align with district curriculum requirements. To find updated resources, look for Open Education Resources (OERs) via your district cloud tools webpage (or equivalent) that contain the same topics as the aging texts. Collaborating with colleagues is another way to get some ideas to help inspire your students' connection to their work. I would get student curiosity and interest piqued about the content in the texts by designing a great hook as an entry point to prime their brains for ideas related to the topics. It could be a PowerPoint I have designed (which would include subtitles for any audio or video and alt text for images), bringing in a physical artifact, doing a demonstration or having a guest speaker come in. I would favor a more emergent approach to the topics that allows students to interface freely to exchange prior knowledge and perhaps some pre-existing interest in the material. To do this, students would be invited to draw connections to the topics via brainstorming sessions where they can use the visual learning strategy of mind mapping, or another strategy that works for them, to make connections between topics and themselves. I would try a project-based learning approach so they have more agency to explore the topics and demonstrate their learning. It's valuable to include, either beforehand or along their learning journey, targeted teaching around skill sets I identify to help students successfully digest material for their projects. This could include applying, analyzing, evaluating, creating, or anything unique to them as learners. The more accessible content is for students with different learning styles, experiences and abilities, the more intrinsically motivated students will be to complete meaningful work.

Pam Gaskill • 2nd-Grade Teacher
Riverside Elementary School, Dublin, OH

Teaching is inherently creative. Use your time and creativity this summer to acquaint yourself with the required objectives, and think about ways in which you can make them meaningful and relevant to your students. Explore other available resources in the community, such as libraries, speakers' bureaus, and resource centers. Plan to incorporate a variety of activities such as videos, group work, field trips, projects, and speakers so that your students will remain interested and involved. Use materials that your students have access to from home—books, videos, artifacts, Internet printouts. It is amazing how cooperative parents can be when asked to help in specified ways. You might even make use of the old workbook pages, not in the traditional way, but for cooperative work. You can facilitate student success by pairing weaker readers with more competent readers to discuss and complete the worksheets. Stress that everyone needs to work together to learn the material. Active participation and engagement with the materials will help your students to construct their own meanings more effectively.

Michael Yasis • 5th-Grade Teacher
L. H. Tanglen Elementary School, Minnetonka, MN

Most learning is acquired through active learning and participation. Therefore, the workbooks that focus on drill and practice, if given as the primary source of learning, most likely would bore the students. I would approach this situation by first engaging the students in a discussion to assess their prior knowledge. I would then challenge and extend their understanding of the concepts through guided discovery, building on similar examples from the "boring" workbooks. While they work on the concepts independently in their workbooks, their confidence and self-esteem will increase.

Kelly Mcelroy Bonin • High School Counselor
Klein Oak High School, Spring, TX

Simply being excited to be working with the third graders and showing interest and enthusiasm for the subject matter should arouse the students' interest and encourage them to learn. How many times have you heard it said, "Mrs. Energy was the best teacher I ever had. She took the most boring, difficult subject and made it fun and interesting." I have heard this so many times both as a student and as a teacher, and it proves my point. Just the fact that the teacher is excited about the material shows the students that this is important information that they need, plus they are curious about the material when they respect and like their teacher. If I felt like the difficulty level of the textbooks was too great, I would have to break the lessons down into smaller increments and use different techniques—discussion, re-teaching, group projects, and so on—to enrich the students and adapt to their level of learning. When your students are motivated, they can accomplish anything—it doesn't matter what materials are available to them, what the difficulty level of the textbook is. Kids will be motivated when their teacher truly cares about them, is passionate about the material, and makes school interesting.

Danielle Hartman • 2nd-Grade Teacher
Claymont Elementary School, Ballwin, MO

First of all, don't get discouraged. You don't need a textbook to be a successful teacher. Look over the district's curriculum guides, and see what the objectives are for each unit you will be teaching. Once you know the objectives, get creative. Keeping the students motivated and interested in learning is essential. By giving them choice and using a variety of teaching methods, you will allow them to stay actively engaged in their learning. You will be amazed at what the students will come up with when they are given choices.

Cluster 13

Creating Supportive Learning Environments



Emma W., Age 5, California, USA

Teachers' Casebook:

Bullies and Victims

What Would You Do?

Two boys are terrorizing one of your students. These boys are larger, stronger, and older than the boy in your class, who is small for his age and gender atypical. There are racial overtones as well—the bullies are White, and the victim is Black. Unfortunately, the bullies are fairly popular, in part because they are successful athletes. There are incidents on the bus before and after school, in the gym, in the hallways, and at lunch—including intimidation, extortion of lunch money, tripping, shoving, and verbal taunts—"fag" and assorted racial epithets are favorite chants. You do not have the two bullies in any of your classes, but your student has started to miss school routinely, and when he is in class, the quality of his work is declining.

Critical Thinking

- How would you handle this situation?
- Who should be involved?
- What would you do about the verbal homophobic and racial insults?
- What would you do if the bullies were in your classes?
- What would you do if the bullies and victim were girls?

Overview and Objectives

"Maintaining a positive and organized classroom setting free from disruption is critical to providing an instructional environment conducive to teaching

and learning. Yet it is by no means an easy task" (Skiba et al., 2016, p. 120). This cluster looks at the ways that teachers create supportive social and physical environments for learning by examining classroom organization and management—two of the main concerns of teachers, particularly beginning teachers, and a significant cause of burnout if teachers feel ineffective (Aloe et al., 2014). The very nature of classes, teaching, and students makes good organization a critical ingredient of success, and we will investigate why this is true. Successful teachers create more time for learning, involve more students, form supportive relationships with students, and help students become self-managing.

A positive learning environment must be established and maintained throughout the year. One of the best ways to accomplish this is by working to prevent problems from occurring at all. But when problems arise—as they always do—an appropriate response is important. What will you do when students challenge you openly in class, when one student asks your advice on a difficult personal problem, or when another withdraws from all participation? We will examine the ways that teachers can communicate effectively with their students in these and many other situations.

By the time you have completed this cluster, you should be able to:

13.1 Relate academic learning time and student cooperation to creating and maintaining a classroom climate conducive to academic achievement and socio-emotional well-being.

13.2 Summarize the research on the contributions to classroom management of rules, procedures, consequences, and the design of the physical space. Give special attention to establishing your management system during the first weeks of class, including the differences in requirements between in-person and remote learning.

13.3 Discuss how to maintain a positive learning environment by encouraging student engagement, preventing problems, and developing caring, respectful relationships with your students.

13.4 Identify strategies (especially penalties and alternatives, restorative justice, and student self-discipline) for preventing and addressing student misbehaviors, including bullying.

13.5 Characterize successful teacher–student and student–student communication through such approaches as empathetic listening, I-messages, and problem solving.

13.6 Explain the need for and approaches to culturally relevant classroom management.

OUTLINE

Teachers' Casebook—Bullies and Victims: What Would You Do?
Overview and Objectives

MODULE 40: Creating Positive Learning Environments
The What and Why of Supportive Classroom Organization
The Basic Task: Gain Their Cooperation
The Basic Goals: Access, Time, Relationships, and Self-Management

Creating a Positive Learning Environment
Relevant Research Results
Routines and Rules Required: In-Person Learning
Routines and Rules Required: Remote Learning
Planning Spaces for Learning
Getting Started: The First Weeks of Class

MODULE 41: What Now? Maintaining a Positive Context for Learning
Maintaining a Good Environment for Learning
Encouraging Engagement
Prevention Is the Best Medicine
Caring Relationships: Connections with School

MODULE 42: Positive Response to Problems, Communication, and Connection
Dealing with Discipline Problems
Stopping Problems Quickly
If You Impose Penalties
What About School Suspensions and Zero Tolerance?
Reaching Every Student: Restorative Justice
Teacher-Imposed Penalties Versus Student Responsibility
Bullying and Cyberbullying
Special Challenges with High School Students

The Need for Communication
Message Sent—Message Received
Empathetic Listening
When Listening Is Not Enough: I-Messages, Assertive Discipline, and Problem Solving

Diversity: Culturally Responsive Management

Cluster 13 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Bullies and Victims: What Would They Do?

MODULE 40 Creating Positive Learning Environments

Learning Objective 13.1 Relate academic learning time and student cooperation to creating and maintaining a classroom climate conducive to academic achievement and socio-emotional well-being.

Learning Objective 13.2 Summarize the research on the contributions to classroom management of rules, procedures, consequences, and the design of the physical space; give special attention to establishing your management system during the first weeks of class, including the differences in requirements between in-person and remote learning.

The What and Why of Supportive Classroom Organization

As we discuss classroom organization in this cluster, I (Anita) will be making a distinction between in-person learning and remote learning. As I noted in Cluster 1, expanding your knowledge and skill to include successfully managing remote learning will prepare you for whatever the future throws your way. Let's start with what you believe.

Stop & Think What do you believe about classroom organization and management? On a 5-point scale from *Strongly disagree* (1) to *Strongly agree* (5), how would you respond to these items?

1. Pupils can be trusted to work together without supervision.
2. Being friendly with pupils often leads them to become too familiar.
3. Teachers should consider revision of their teaching methods if these methods are criticized by their pupils.
4. Pupils often misbehave in order to make the teacher look bad.
5. It is often necessary to remind pupils that their status in school differs from that of teachers.

Items 2, 4, and 5 in the *Stop & Think* challenge are *custodial* items. If you tended to agree with these items, you probably are more teacher-centered in your philosophy of management and interested in maintaining order, rules, and structure in your classes. If you tended to agree more with items 1 and 3, you may tend to be more *humanistic* in your philosophy and are more optimistic about students' abilities to become responsible and self-regulated learners. You just took five items from the PCI (Pupil Control Ideology) scale. It was developed by my husband, Wayne Hoy, and his colleagues over 50 years ago and is still used widely today (Willower et al., 1967). If you want to take the full survey, go to https://www.waynekhoy.com/pupil-control.

In study after study, classroom organization stands out as the variable with the largest impact on student achievement and social competence (Marzano & Marzano, 2003; Murray et al., 2018). Knowledge of and skill in classroom management are marks of expertise in teaching, and stress and exhaustion from managerial difficulties are precursors to teacher burnout (Emmer & Stough, 2001; Hong, 2012). What is it about classrooms that makes organization so critical?

Classrooms are particular kinds of environments. They have distinctive features that influence their inhabitants no matter what the teacher believes about education (Doyle, 2006). Classrooms are *multidimensional*. They are crowded with people, tasks, and time pressures. Many individuals—all with differing goals, preferences, and abilities—must share resources, use and reuse materials without losing them, move into and out of the room, and so on. Events occur *simultaneously*—everything happens at once, and the pace is fast. Teachers have literally hundreds of exchanges with students during a single day. In this rapid-fire existence, events are *unpredictable*. Even when plans are carefully made, a lesson can still be interrupted by a technology glitch or a loud, angry discussion right outside the classroom. Because classrooms are *public*, the way the teacher handles these unexpected intrusions is seen and judged by everyone. Students are always noticing if the teacher is being "fair." Is there favoritism? What happens when a rule is broken? Finally, classrooms have *histories*. The meaning of a particular teacher's or student's actions depends in part on what has happened before. The 15th time a student arrives late requires a different teacher response compared with the first late arrival. In addition, the history of the first few weeks of school affects life in the class for the rest of the year.

The Basic Task: Gain Their Cooperation

The basic organizational task for teachers is to achieve order and harmony by gaining and maintaining student cooperation in class activities (Doyle, 2006). Given the multidimensional, simultaneous, fast-paced, unpredictable, public, and historical nature of classrooms, this is quite a challenge. Gaining student cooperation means planning activities, having materials ready, making appropriate behavioral and academic demands on students, giving clear signals, accomplishing transitions smoothly, foreseeing problems and stopping them before they start, selecting and sequencing activities so that flow and interest are sustained, maintaining positive, encouraging relationships with students based on mutual respect—and

much more. Also, different activities require different skills. For example, a new or complicated activity may be a greater threat to classroom order than a familiar or simple activity.

Obviously, gaining the cooperation of kindergartners is not the same task as gaining the cooperation of high school seniors. During kindergarten and the first few years of elementary school, direct teaching of classroom rules and procedures is important. For children in the middle elementary years, many classroom routines have become relatively automatic, but new procedures for a particular activity may have to be taught directly, and the entire system still needs monitoring and maintenance. Toward the end of elementary school, some students begin to test and defy authority. The challenges at this stage are to deal productively with these disruptions and to motivate students who are becoming less concerned about teachers' opinions and more interested in their social lives. By the end of high school, the challenges are to handle the curriculum, fit academic material to students' interests and abilities, and help students become more self-managing so they are ready for life after high school (Emmer & Evertson, 2017; Evertson & Emmer, 2017).

The Basic Goals: Access, Time, Relationships, and Self-Management

Stop & Think You are interviewing for a job in a great district—it is known for innovation. The assistant principal looks at you for a moment and then asks, "What is your philosophy of classroom management?" How would you answer?

One of my students was asked the *Stop & Think* question about her classroom management philosophy during a job interview. She told me she got the job and was grateful she had paid attention to this cluster! **Classroom management** is an overarching name for a whole range of "strategies teachers use on a daily basis to build a positive classroom environment that is structured, engaging, and productive, and encourages student learning and growth" (Gaias et al., 2019, p. 124). Classroom management is more than just order—order for its own sake is an empty, unethical goal. What, then, is the point of working so hard to manage classrooms? There are at least four reasons, and here they are.

ACCESS TO LEARNING. Each classroom activity has its own rules for participation. Sometimes these rules are clearly stated by the teacher, but often they are implicit and unstated. For example, in a reading group, students may have to raise their hands to make a comment, but in a morning meeting in the same class, they may simply have to catch the teacher's eye. Teacher and students may not even be aware that they are following different rules for different activities. These rules, or **participation structures**, define who can talk, what they can talk about, when and to whom they can talk, and how long they can talk. Because the participation structures that some students use at home do not match those for school, these students may not participate as successfully in classroom activities (Cazden, 2001; Charles & Cole, 2019).

What can we conclude? To reach the first goal of good classroom organization—giving all students access to learning—you must make sure everyone knows *how* to participate in class activities. The key is awareness. What are your rules and expectations? Are they understandable, given your students' cultural backgrounds and home experiences? What unspoken rules or values may be operating? Are you clearly signaling appropriate ways to participate? Some students, particularly those with behavioral and emotional challenges, may require direct teaching and practicing of important participation behaviors (Emmer & Stough, 2001).

Classroom management
Techniques used to maintain a healthy learning environment, relatively free of behavior problems.

Participation structures
The formal and informal rules for how to take part in a given activity.

MORE TIME FOR LEARNING. I once used a stopwatch to time the commercials during a TV quiz show. I was amazed to find that half of the program was devoted to commercials. Seems like football games are even worse! If you used a similar approach in classrooms, timing all the different activities throughout the day, you might be surprised by how little actual teaching takes place. Almost every study examining time and learning has found a significant relationship between time spent on content and student learning. Yet many minutes each day are lost through interruptions, disruptions, late starts, and rough transitions (C. S. Weinstein & Novodvorsky, 2015).

A school year seems like a long time, right? Let's say a typical high school class is mandated by the state to meet 126 hours per school year (180 days times 42 minutes a day). When we consider student absences and school interruptions such as assembly programs, those 126 hours are more like 119 hours *available* for learning for the typical student. But in every class, elementary or secondary, there are interruptions, clerical tasks, lunch, changing classrooms (or recess in elementary school), collecting and distributing materials, and dealing with behavior problems, so the time available for teaching is typically decreased by about 20%. Now we are left with 96 hours of actual *instructional time*. Good classroom organization can take back some of those hours for teaching so that more instructional time is available.

But simply making more time for instruction will not automatically lead to learning. To be valuable, time must be used effectively. Basically, students will learn what they think about deeply, practice, and apply. Time spent actively involved in specific learning tasks often is called **engaged time** or sometimes **time on task**—we can estimate this to be about 80% of the instructional time. Again, however, engaged time doesn't guarantee learning. Students may be struggling with material that is too difficult, or they may be using the wrong learning strategies. When students are working with a high rate of success—really learning and understanding—we call the time spent **academic learning time**; again, we can estimate this to be about 80% of the time they are engaged. Now we are down to 62 hours.

Figure 13.1 shows how the 126-plus hours of time mandated for a high school year in most states can become only about 62 hours of quality academic learning time for a typical student. So the third goal of class management is to increase academic learning time by keeping all students *actively engaged in worthwhile, appropriate learning activities*. Engagement in the early grades predicts achievement in later grades and even the decision to drop out of high school (Fredricks et al., 2004).

Engaged time
Time spent actively engaged in the learning task at hand. Also referred to as *time on task*.

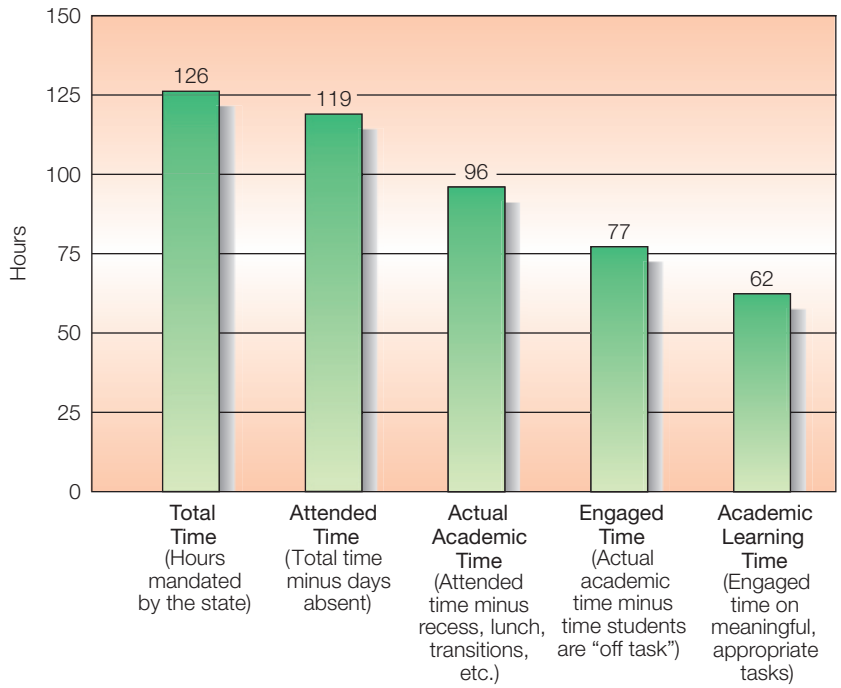
Time on task
Time spent actively engaged in the learning task at hand. Also referred to as *engaged time*.

Academic learning time
Time when students are actually succeeding at the learning task.

MANAGEMENT MEANS RELATIONSHIPS. All students should feel emotionally and physically safe in the classroom. Beyond that, they also should experience respect and caring. When students feel caring and support from their teachers and their peers, they are more

Figure 13.1 Who Knows Where The Time Goes?

The 126-plus hours per year of instruction in a class mandated by most states can represent only 60 to 70 hours of quality academic learning time.



Source: From *Middle and secondary classroom management* (5th ed.), by C. S. Weinstein and I. Novodvorsky. McGraw-Hill. Copyright © 2015 by The McGraw-Hill Companies, p. 182. Adapted with permission of The McGraw-Hill Companies, Inc.

likely to cooperate with classroom activities. Cooperation leads to learning, learning to a sense of self-efficacy, and self-efficacy to more cooperation. The opposite is true as well. When students sense that their teachers and peers don't care about them, they feel no particular desire to cooperate—why cooperate with people who don't like or respect you? The research on teacher–student relationships is clear. When teachers focus on developing high-quality, trusting relationships, students are less defiant, more willing to seek appropriate help, less likely to be absent or to be held back in school, and more likely to achieve (Chen et al., 2019; Dennie et al., 2019; Meyer & L. Anderman, in press).

MANAGEMENT FOR SELF-MANAGEMENT. The final goal of any organizational system is to help students become better able to manage themselves. If teachers focus on student compliance, they will spend much of the teaching/learning time monitoring and correcting. Students come to perceive the purpose of school as just following rules, not constructing deep understanding of academic knowledge. And complex learning structures such as cooperative or problem-based learning require student *self-management*. Compliance with rules is not enough to make these learning structures work (McCaslin & Good, 1998).

The movement from demanding obedience to teaching self-regulation and self-control is a major shift in discussions of classroom management (Evertson & Weinstein, 2006). Students learn self-control by making choices and dealing with the consequences, setting goals and priorities, managing time, collaborating to learn, mediating disputes, making peace, and developing trusting relations with trustworthy teachers and classmates (Bear, 2005).

Self-management
Management of your own behavior and acceptance of responsibility for your own actions. Also the use of behavioral learning principles to change your own behavior.

Encouraging **self-management** requires extra time, but teaching students how to take responsibility is an investment well worth the effort. Nancy Perry and Rebecca Collie (2011) compared a preservice preparation program that instructed student teachers about how to coach their students to be self-regulated learners with other programs that did not emphasize self-regulation. The student teachers who developed self-regulation knowledge and skills were more confident, less stressed, and more engaged during their student teaching compared to other prospective teachers who did not learn how to help their students to become self-regulated. This makes sense—if you teach your students to manage their own behavior and learning, you should have fewer management problems, less stress, and more time to teach, which would support your growing sense of teacher efficacy. In another study of ethnic minority students in the Netherlands, researchers concluded that teaching emotional self-regulation skills such as anger management early in the school year led to better relationships and less conflict with the teachers by the end of the year (de Jong et al., 2018). These relationships probably are reciprocal, that is, teachers develop closer relationships with students who can manage their emotions, and students have less trouble managing their emotions when they feel close to and supported by teachers.

Creating a Positive Learning Environment

As you think about creating a positive learning environment, review what you already know from this book (retrieval practice is great for learning, right?). You know, for example, that problems are prevented when individual variations such as those discussed in Clusters 2 through 6 are taken into account in instructional planning. Sometimes students become disruptive because the work assigned is too difficult. And students who are bored by easy lessons may find more exciting activities to fill their time.

In one sense, teachers prevent discipline problems whenever they make an effort to motivate students. A student engaged in learning is usually not involved in a clash with the teacher or other students at the same time. All plans for motivating students are steps toward preventing problems. And what do we know about *learning*? We know students need clear goals and examples, practice and review, active participation, and the chance to form connections. Learning how to *live productively* in classrooms is no exception.

Relevant Research Results

What else can teachers do? For several years, educational psychologists at the University of Texas at Austin investigated classroom management quite thoroughly (Emmer & Evertson, 2017; Emmer & Gerwels, 2006; Evertson & Emmer, 2017). Their general approach was to study a large number of classrooms, making frequent observations during the first weeks of school and less frequent visits later in the year. After several months, the researchers noted dramatic differences. Some classes had very few organizational or behavioral problems, whereas others had many. The most and least effective teachers were identified on the basis of the quality of their students' classroom behavior and achievement later in the year.

Next, the researchers looked at their observation records of the first weeks of class to see how the effective teachers *got started*, and they made other comparisons between the teachers who ultimately had harmonious, high-achieving classes and those whose classes were fraught with problems. On the basis of these comparisons, the researchers developed a number of principles. They then taught these principles to a new group of teachers, and the results were impressive. Teachers who applied the principles had fewer problems, their students spent more time learning and less time disrupting, and achievement was higher. The findings of these studies formed the basis for two books on classroom management (Emmer & Evertson, 2017; Evertson & Emmer, 2017). Many of the ideas in the following pages are from these books. (Personal aside—Ed Emmer was my dissertation supervisor at the University of Texas.)

Routines and Rules Required: In-Person Learning

Stop & Think What are the three or four most important rules you will have for your in-person classroom?

In this section we focus on organizing traditional in-person classrooms. At the elementary school level, teachers must lead 20 to 30 students of varying abilities through many different activities each day. Without efficient rules and procedures, a great deal of time is wasted dealing with the same questions and issues over and over. "Emily tripped me!" "I left my homework on the bus." At the secondary school level, teachers must meet daily with more than 100 students who use dozens of materials and often change rooms. Secondary school students are also more likely to challenge teachers' authority.

The effective managers studied by Emmer, Evertson, and their colleagues had planned *procedures* and *rules* for coping with all these situations. These procedures and rules were clear and concrete, stated in positive terms whenever possible (what to do instead of what not to do), observable and not vague, taught and practiced, and reviewed when needed (Skiba et al., 2016).

ROUTINES AND PROCEDURES. How will materials and assignments be distributed and collected? Under what conditions can students leave the room? How will grades be determined? What are the special routines for handling equipment and supplies in science, art, or vocational classes? **Procedures and routines** describe how activities are accomplished in classrooms, but they are seldom written down; they are simply the ways of getting things done in class. Carol Weinstein and her colleagues (Romano & Weinstein, 2019; Weinstein & Novodvorsky, 2015) suggest that teachers establish routines to cover the following areas for in-person instruction:

1. *Administrative routines,* such as taking attendance
2. *Student movement,* such as entering and leaving or going to the bathroom
3. *Housekeeping,* such as watering plants or storing personal items
4. *Lesson-running routines,* such as how to collect assignments or return homework
5. *Interactions between teacher and student,* such as how to get the teacher's attention when help is needed
6. *Talk among students,* such as giving help or socializing

You might use these six areas as a framework for planning your class routines. The *Guidelines: Establishing Class Routines for In-Person Learning* on the next page should help you as you plan.

Connect and Extend to PRAXIS II®

Procedures and Routines (I, C4)

Efficient procedures and routines reduce confusion and opportunities for misbehavior, and they save time that can be devoted to learning tasks. Identify frequent activities or classroom events that would benefit from well-structured procedures or routines. Explain principles for establishing procedures and routines so that students are likely to observe them.

Procedures/routines

Prescribed steps for an activity.

GUIDELINES

Establishing Class Routines for In-Person Learning

Determine procedures for student upkeep of desks, classroom equipment, and other facilities.

Examples

1. Set aside a cleanup time each day or once a week in self-contained classes.
2. Demonstrate and have students practice how to push chairs under the desk, take and return materials stored on shelves, silence or remove phones, use the sink or water fountain, assemble lab equipment, and so on.
3. Put a rotating monitor in charge of equipment or materials.

Decide how students will be expected to enter and leave the room.

Examples

1. Have a procedure for students to follow as soon as they enter the room. Some teachers have a standard assignment ("Have your homework out and be checking it over").
2. Inform students under what conditions they can leave the room, and make sure they understand when they need to ask for permission to do so.
3. Tell students how they should gain admission to the room if they are late.
4. Set up a policy about class dismissal. Many teachers require students to be in their seats and quiet before they can leave at the end of class. The teacher, not the bell, dismisses class.

Establish signals for getting students' attention and teach them to your students.

Examples

1. In the classroom, flick the lights on and off, sound a chord on a piano or recorder, sound a bell like the "ring bell for service" at a sales counter, move to the podium and stare silently at the class, use a phrase like "Eyes, please," or move to the front of the class.
2. In the halls, raise a hand, clap once, or use some other signal to indicate "Stop."
3. On the playground, raise a hand or whistle to indicate "Line up."

Set routines for student participation in class.

Examples

1. Decide whether you will have students raise their hands for permission to speak or simply require that they wait until the speaker has finished.
2. Determine a signal to indicate that you want everyone to respond at once. Some teachers raise a cupped hand to their ear. Others preface the question with "Everyone."
3. Make sure you are clear about differences in procedures for different activities: reading group, learning center, discussion, teacher presentation, seatwork, peer learning group, library, and so forth.
4. Establish how many students at a time can be at the teacher's desk, learning center, sink, bookshelves, class computers, reading corner, or bathroom.

Determine how you will communicate, collect, and return assignments.

Examples

1. Establish a place for listing assignments. Some teachers reserve a particular corner of the board for assignments. Others write assignments in colored chalk. For younger students, it may be better to prepare assignment sheets or folders, color-coding them for the math workbook, reading packet, and science kit. When all students have home access to the Internet, teachers can post assignments online on a class calendar and include alerts or reminders for students who are not keeping up.
2. Be clear about how and where assignments should be collected. Some teachers collect assignments in a box or bin; others have a student collect work while they introduce the next activity; some collect online.

For ideas about involving students in developing rules and procedures, see https://www.edutopia.org/article/simple-ways-promote-student-voice-classroom.

RULES. Unlike routines, **rules**, which specify expected and forbidden actions in the class, are often written down and posted. They are the dos and don'ts of classroom life. In establishing rules, you should consider what kind of atmosphere you want to create. What student behaviors will help you teach effectively? What limits do the students need to guide their behavior? The rules you set should be consistent with school rules and also in keeping with principles of learning. For example, we know from the research on small-group learning that students benefit when they explain work to peers. They learn as they teach. A rule that forbids students to help each other may be inconsistent with good learning principles. Or a rule that says, "No erasures when writing" may make students focus more on preventing mistakes than on communicating clearly in their writing (Emmer & Stough, 2001; Romano & Weinstein, 2019).

Rules should be positive and observable (raise your hand to be recognized). Having a few general rules that cover many specifics is better than listing all the dos and don'ts. But, if specific actions are forbidden, such as leaving the campus, then a rule should make this clear (Emmer & Gerwels, 2006).

RULES FOR IN-PERSON TEACHING IN ELEMENTARY SCHOOL. Evertson and Emmer (2017) give four examples of general rules for elementary school classes:

1. *Respect and be polite to all people.* Give clear explanations of what you mean by "polite," including not hitting, fighting, or teasing. Examples of polite behavior include waiting your turn, saying "please" and "thank you," and not calling names. This applies to behavior toward adults (including substitute teachers) and peers.
2. *Be prompt and prepared.* This rule highlights the importance of the academic work in the class. Being prompt includes the beginning of the day as well as transitions between activities. Being prepared means the having the right materials and the right mental attitude for success.
3. *Listen quietly while others are speaking.* This applies to the teacher and other students, in both large-class lessons and small-group discussions.
4. *Obey all school rules.* This reminds students that all school rules apply in your classroom. Then students cannot claim, for example, that they thought it was OK to chew gum or listen to music on their smartphone in your class, even though these are against school rules, "because you never made a rule against it for us."

Whatever the rule, students need to be taught the behaviors that the rule includes and excludes. Examples, practice, and discussion will be needed before learning is complete.

As you've seen, different activities often require different rules. This can be confusing for elementary students until they have thoroughly learned all the rules. To prevent confusion, you might consider making signs that list the key rules for each activity. Then, before the activity, you can post the appropriate sign as a reminder. This provides clear and consistent cues about participation structures so all students, not just the "well behaved," know what is expected. Of course, you'll need to explain and discuss these rules before the signs can have their full effect.

RULES FOR IN-PERSON TEACHING IN SECONDARY SCHOOL. Emmer and Evertson (2017) suggest five examples of rules for secondary students:

1. *Be prompt and prepared.* Prompt means being in class on time but also moving quickly into and out of group work or other tasks. Being prepared means having the right materials (the type of pen, pencil, paper, laptop or tablet, notebook, texts, and so on) and the right attitude for learning.
2. *Respect and be polite to all people.* This covers fighting, verbal abuse, and general troublemaking, but emphasize as well positive examples of respect and kindness. *All people* includes the teacher and substitute teachers.
3. *Listen and stay seated while someone else is speaking.* This applies when the teacher or other students are talking.

Connect and Extend to PRAXIS II®

Rules (I, C4)

Fair, consistently enforced rules can have a positive effect on motivation to learn by promoting a safe and warm classroom environment. Describe how to establish and maintain effective rules. Keep in mind age-related concerns.

Rules

Statements specifying expected and forbidden behaviors; dos and don'ts.

4. *Respect other people's property.* This means property belonging to the school, the teacher, or other students. Take care of others' property, ask permission to borrow, and return borrowed items in good shape.
5. *Obey all school rules.* As with the elementary class rules, this covers many behaviors and situations so you do not have to repeat every school rule for your class. This reminds students that the school rules apply in your room, too, and gives you the chance to talk about which school rules are particularly important in your class (no cell phones, no texting…). It also reminds the students that you will be monitoring them inside and outside your class. Make sure you know all the school rules. Some secondary students are very adept at convincing teachers that their misbehavior "really isn't against the rules."

These rules are more than ways to maintain order. In their study of 34 middle school classrooms, Lindsay Matsumura and her colleagues (2008) found that having explicit rules about respecting others in the classroom predicted the number of students who participated in class discussion, so it seems clear that respect is a gateway to student engagement and class dialogue that supports learning.

CONSEQUENCES. As soon as you decide on your rules and procedures for in-person learning, you must consider what you will do when a student breaks a rule or does not follow a procedure. It is too late to make this decision after the rule has been broken. For many infractions, the logical consequence is going back to "do it right." Students who run in the hall may have to return to where they started and walk properly. Incomplete papers can be redone. Materials left out should be put back. You can use **natural or logical consequences** to support social and emotional development by doing the following (Charles & Cole, 2019; M. J. Elias & Schwab, 2006):

Natural/logical consequences

Instead of punishing, have students redo, repair, or in some way face the consequences that naturally flow from their actions.

- Separate the deed from the doer in your response. The problem is the behavior, not the student.
- Emphasize to students that they have the power to choose their actions and so avoid losing control.
- Encourage student reflection, self-evaluation, and problem solving. Avoid teacher lecturing.
- Help students identify and give a rationale for what they could do differently next time in a similar situation.

The main point here is that decisions about consequences (positive and negative) must be made early on so students know before they follow or break a rule or procedure what this will mean for them. I encourage my student teachers to get a copy of the school rules and their cooperating teacher's rules and then plan their own. Sometimes, consequences are complicated, as you will see when we discuss penalties later in this cluster.

WHO SETS THE RULES AND CONSEQUENCES? In Cluster 1, I described Ken, an expert teacher who worked with his students to establish a students' "Bill of Rights" instead of defining rules. These "rights" cover most situations that might require a "rule" and help the students move toward the goal of becoming self-managing. In a recent class, the Bill of Rights included the rights to be treated politely, have a 2-minute break between working periods, make choices about the day's schedule, and not have people take your things, among several others. If you are going to involve students in setting rules or creating a constitution, you may need to wait until you have established a sense of community in your classroom. Before students can contribute meaningfully to the class rules, they need to trust the teacher and the situation (M. J. Elias & Schwab, 2006).

Developing rights and responsibilities rather than rules makes an important point to students. "Teaching children that something is wrong because there is a rule against it is not the same as teaching them that there is a rule against it because it is wrong, and helping

Table 13.1 Laws to Protect Our Rights

1. Follow directions the first time.
2. Speak nicely, be courteous, and respect other people, their feelings, and their things. Follow the Bill of Rights.
3. Laugh at the right time for the right time.
4. Respect others' right to learn. Do not distract others. Don't be nosy. Don't yell. Remember to get quiet at countdown.
5. Talk at the right times with the right tone of voice and volume.
6. Make sure transitions and movements are calm, quiet, careful, and elegant.
7. Follow all classroom and school procedures, like: bathroom; lunch and recess; morning; dismissal; etc.

Source: From *Elementary classroom management* (7th ed.), p. 104, by M. E. Romano and C. S. Weinstein. McGraw-Hill. Copyright © 2019 by The McGraw-Hill Companies. Adapted with permission of The McGraw-Hill Companies, Inc.

them to understand why this is so" (C. S. Weinstein, 1999, p. 154). Students should understand that the rules are developed so that everyone can work and learn together. I might add that when Ken had some very difficult classes, he and his students established some "laws" that protect students' rights, as you can see in Table 13.1.

Routines and Rules Required: Remote Learning

When Emily Pulham and Charles Graham (2018) reviewed studies of the skills needed for hybrid teaching compared to the skills needed for online-only instruction, they found that management played a big role in both approaches. They also found that few preservice teachers were taught relevant skills for organizing and managing hybrid or remote learning. Some of the important competencies are setting expectations, managing time, monitoring students' behavior, designing appropriate discipline strategies, and handling communication and collaboration. Even if students are not in the room, the managerial challenges are still the same—gain their cooperation, create community and an engaging learning environment, develop routines so students know what is expected, and build relationships. As Heather Wolpert-Gawron (2017) noted, "… many online educators don't realize that the best practices in traditional environments should not be discarded simply because the participants are interacting digitally from various locations. They still need to be managed as a cohesive group of learners" (p. 1).

So what are experienced teachers learning about organizing and managing remote instruction? The *Guidelines: Establishing Routines and Rules for Remote Learning* will give you ideas. Some suggestions are based in part on Healy (2020), Hoy (2020), Lisciandrello (2020), Schwartz (2020), and Wolpert-Gawron (2017).

GUIDELINES

Establishing Routines and Rules for Remote Learning

In the first online session, give a tour of your virtual class environment.

Examples

1. Demonstrate where online your students can find class meeting times, teacher office hours, assignments, and due dates.
2. Determine the class norms and expectations for office hours, videoconferencing, and discussions (see next two guidelines for details). Post these online and show students where to find them.
3. Record this virtual tour of the class, and post it so students can go back and review.
4. Give an extra-credit quiz on the information provided so students will pay attention and take it seriously—watch the reviewing of your virtual tour take off!

(Continued)

Give students these tips about how to use videoconferencing effectively.

Examples

1. Begin every day by restarting your computer and turning off all notifications and alerts.
2. Make sure your device is prepared for videoconferencing. Close any browser windows and unneeded applications to ensure your computer's processing power is able to stream and receive video.
3. Put your iPad/Chromebook on a table or flat surface—avoid moving your device around unless you are instructed to.
4. Make sure you are using the built-In microphone (internal microphone) and built-in output (internal speakers); then mute your microphone BEFORE you join—this limits background noise and visual distractions for all participants. Your teacher may also take control of the microphone feature for the class.
5. If you are having technical trouble, send a chat message to your teacher.

Establish student norms and expectations for office hours and videoconferencing: dos and don'ts.

Examples

1. Do be on time and prepared. Have all the materials you will need.
2. Do dress like you are in the classroom—no pajamas or T-shirts with offensive messages.
3. Do set up your space for serious work. Remember, everyone can see your space and background. Turn off distractions such as TVs or music. Locate in a quiet area and/or use headphones to reduce background noise.
4. Don't chew gum or eat (except with accommodations, just like in-person school)—no crumbs or ketchup on your chin.
5. Don't send messages or have side conversations. This is still school, so no sharing of Minecraft strategies in private chats.
6. Sit so you can be seen.

Establish norms and expectations for video discussions.

Examples

1. Don't interrupt the speaker, but know how to request a turn.
2. Use constructive criticism only. Be respectful and kind.
3. Share the time—give others a chance to speak. Build on their ideas.
4. Ask questions.
5. Do not record the meeting—in some states that could be illegal.

Make special efforts to create community and build relationships, even though it is at a distance.

Examples

1. Write a "Welcome Letter" to all your students before school starts, assuring them you will work together to navigate any new remote learning territory. See Figure 13.2 for the letter our daughter wrote to her fifth-grade students.
2. Find ways for students to learn more about each other—share information about personal interests, activities, and concerns. Find commonalities in their life experiences. If everyone has Internet access, make a brief introductory video of yourself and have students do the same—post the videos in an "Our Class" folder.
3. Create connections with small-group and breakout sessions, but don't group randomly. Decide on criteria for forming groups—interests? Goals? Similar or different skills to contribute to group projects?
4. Have students create a contract for small-group work—how will they treat each other, and how will they get the work done?
5. Tell students they should use their real names—no changing their Zoom ID or Google profile to a nickname or anything but the name used in school.
6. Create a spreadsheet with all the ways to contact each student and the student's caregiver—email, phone, text.

Be present and available for students.

Examples

1. Set up a virtual office and times for students to be in touch with questions and concerns. Some teachers use Google Hangout or Skype.
2. Be wise about contacting students. Send messages to the whole class when everyone needs to know and to individual working groups just for their concerns, and occasionally email or call an individual student when a private message is needed (use this sparingly).
3. Participate in discussion threads. If a discussion is dying down, share your thoughts.
4. Take more time than usual to check in with students. How are they feeling and coping?
5. Make boundaries on your time clear. When are you **not** available?

Teach about plagiarism. It is easy to cheat online.

Examples

1. Cite sources.
2. Use your own words or indicate when you are quoting.
3. Online plagiarism is easy to detect—let students know you are checking.
4. Discuss examples of plagiarism.

Time management can be a big problem—address it directly.

Examples

1. Establish deadlines and interim deadlines for assignments.
2. Set a class calendar and automatic reminders if possible.

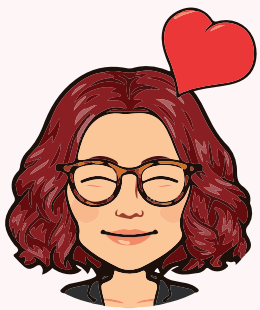
For more information, see https://www.edutopia.org/article/simple-ways-promote-student-voice-classroom.



Welcome to fifth grade humanities! My name is Ms. Hoy and I wanted to take a moment and tell you how excited I am to have you in class. We will be starting the year virtually and I have many fun lessons planned for the beginning of the year and beyond. I am eager to hear about all the good books you have read and your summer antics with your family. We will take this distance learning journey one day at a time.

I took the liberty of putting together a small humanities folder for each of you. No need to read anything or do anything in this folder yet—I will explain the activities and materials on the first day of class. Bring a pencil, spiral notebook, and any markers or colored pencils/crayons that you might use.

In our distance learning schedule, you will have some humanities sessions on Zoom and these classes are referred to as synchronous. There are also days where you will be working independently and we refer to these classes as asynchronous (The little "a" at the beginning of synchronous changes the whole meaning of the word.) Do not fret—we will go over how to navigate your schedule. The schedule for the first partial week is a little different so that you can meet all of your teachers in the first three days.



We will spend the first few weeks of school getting to know each other as people and as learners. Our discussions will center around identity and what it means to be an ally. We will begin writing stories together, playing games, and choosing new books. Until we meet in "Zoomland" enjoy your time with your family and get some rest for the first official day of upper school on September 2, 2020. Go fifth grade! The bitmoji to the left is me closing my eyes and imagining our time together.

I look forward to seeing you soon.

Ms. Hoy

Source: Kelly L. Hoy, September 2020. Used with permission.

Figure 13.2 Welcome to Remote Learning

Sending something similar to this informative and reassuring letter should ease the stress of your students as they face a new school situation (K. Hoy, 2020). Even without an unexpected switch to different pathways for teaching and learning, every new year is stressful for most students. Make sure they feel welcome, whether in person or online, as you address their major concerns first.

Planning Spaces for Learning

Stop & Think Think back over all the rooms in all the schools you have attended. Which ones stand out as inviting or exciting? Which ones were cold and empty? Did one teacher have a design that let students do different things in various parts of the room?

Connect and Extend to PRAXIS II®

Classroom Space (I, C4)

The physical organization of a class has an effect on student behavior and learning. Describe how the physical layout of classrooms can affect the learning environment. Apply principles of classroom organization to enhance learning and minimize disruption.

Spaces for learning should invite and support the activities you plan for your classes, and they should respect the inhabitants of the space. This respect begins at the door for young children by helping them identify their classroom. One school that has won awards for its architecture paints each classroom door a different bright color so young children can find their "home" (Herbert, 1998). Once inside, spaces can be created that invite quiet reading, group collaboration, focused lectures, discussion and debate, or independent research. If students are to use materials, they should be able to reach them. Students with disabilities should feel welcome by being able to easily navigate in the space. Of course, teachers have to design spaces for health and safety today, too—so more space may be needed between students if social distancing is required.

In terms of classroom arrangement, there are two basic ways of organizing space: personal territories and interest areas.

PERSONAL TERRITORIES AND SEATING ARRANGEMENTS. A personal territory is your own (usually assigned) seat. Years of research indicate that a front seat location seems to increase participation and learning for students who are predisposed to speak in class, but a seat in the back will make it more difficult to participate and easier to sit back and daydream (Blume et al., 2019). To "spread the action around," Romano and Weinstein (2019) suggest that teachers move around the room when possible, establish eye contact with and direct questions to students seated far away, and vary the seating so the same students are not always consigned to the back.

Horizontal rows share many of the advantages of the traditional row and column arrangements. Both are useful for independent seatwork and teacher, student, or media presentations; they encourage students to focus on the presenter and simplify housekeeping. Horizontal rows also permit students to work more easily in pairs. However, this is a poor arrangement for large-group discussion.

Clusters of four or circle arrangements are best for student interaction. Clusters permit students to talk, help one another, share materials, and work on group tasks. Circles are especially useful for discussions but still allow for independent seatwork. Both arrangements, however, are poor for whole-group presentations and may make class management more difficult.

The *fishbowl or stack* special formation, where students sit close together near the focus of attention (the back row may even be standing), should be used only for short periods of time because it is not comfortable and can lead to discipline problems. On the other hand, the fishbowl can create a feeling of group cohesion and is helpful when the teacher wants students to watch a demonstration, brainstorm on a class problem, or see a small visual aid.

INTEREST AREAS. The design of interest areas can influence the way the areas are used by students. Years ago, for example, my friend Carol Weinstein (1977) worked with a teacher to make changes in interest areas that helped the teacher meet her objectives of having more girls involved in the science center and having all students experiment more with a variety of manipulative materials. In a second study, changes in a library corner led to more involvement in literature activities throughout the class (Morrow & Weinstein, 1986).

Personal territories and interest areas are not mutually exclusive; many teachers use a design that combines these types of organization. Individual students' desks—their territories—are placed in the center, with interest areas in the back or around the periphery of the room. This allows the flexibility needed for both large- and small-group activities. No matter how you arrange your classroom, keep the *Guidelines: Designing Learning Spaces* in mind.

GUIDELINES

Designing Learning Spaces

Note the fixed features, and plan accordingly.

Examples

1. Remember that the media center, computers, and charging stations for tablets need electrical outlets.
2. Keep art supplies near the sink, small-group work by a whiteboard.

Create easy access to materials and a well-organized place to store them.

Examples

1. Make sure materials are easy to reach and visible to students.
2. Have enough shelves so that materials need not be stacked.

Provide students with clean, convenient surfaces for studying.

Examples

1. Put bookshelves next to the reading area, games by the game table.
2. Prevent fights by avoiding crowded workspaces.

Avoid dead spaces and "racetracks."

Examples

1. Don't have all the interest areas around the outside of the room, leaving a large dead space in the middle.
2. Avoid placing a few items of furniture right in the middle of this large space, creating a "racetrack" around the furniture.

Arrange things so you can see your students and they can see all instructional presentations.

Examples

1. Make sure you can see over partitions.
2. Design seating so that students can see instruction without moving their chairs or desks.

Make sure work areas are private and quiet.

Examples

1. Make sure there are no tables or work areas in the middle of traffic lanes; a person should not have to pass through one area to get to another.
2. Keep noisy activities as far as possible from quiet ones. Increase the feeling of privacy by placing partitions, such as bookcases or pegboards, between areas or within large areas.

Provide choices and flexibility.

Examples

1. Establish private cubicles for individual work, open tables for group work, and cushions on the floor for whole-class meetings.
2. Give students a place to keep their personal belongings. This is especially important if students don't have personal desks.

Be sensitive to the symbolic communication of spatial features.

Examples

1. In a history class, in all the posters and pictures on the wall, are only white male historical characters displayed?
2. Do students see their culture, language, and symbols represented in visuals and decorations?
3. Are the shelves, workspaces, computers, and so on, easily accessible to students with disabilities?

(Continued)

Try new arrangements; then evaluate and improve.

Examples

1. Have a "2-week arrangement"; then evaluate.
2. Enlist the aid of your students. They have to spend many hours in the room too, and designing a classroom can be a very challenging educational experience.

For more ideas on classroom design, go to http:// www.edutopia.org and search for "classroom designs."

Getting Started: The First Weeks of Class

Determining a room design, rules, and procedures are the first steps toward having a well-organized class, but how do effective teachers gain students' cooperation in those early critical days and weeks? One study carefully analyzed the first weeks' activities of effective and ineffective elementary teachers, and found striking differences (Emmer & Evertson, 2017; Evertson & Emmer, 2017).

EFFECTIVE MANAGERS FOR ELEMENTARY STUDENTS. In the *effective teachers' classrooms*, the very first day was well organized. Nametags were ready. There was something interesting for each child to do right away. Materials were set up. The teachers had planned carefully to avoid any last-minute tasks that might take them away from their students. These teachers dealt with the children's pressing concerns first. "Where do I put my things?" "How do I pronounce my teacher's name?" "Can I whisper to my neighbor?" "Where is the bathroom?" The effective teachers were explicit about their expectations. They had a workable, easily understood set of rules and taught the students the most important rules right away. They taught the rules like any other subject—with lots of explanation, examples, and practice.

Throughout the first weeks, the effective managers continued to spend quite a bit of time teaching rules and procedures. Some used guided practice to teach procedures; others used rewards to shape behavior. Most taught students to respond to a bell or some other signal to gain their attention. These teachers worked with the class as a whole on enjoyable academic activities. They did not rush to get students into small groups or to start them in readers. This whole-class work gave the teachers a better opportunity to continue monitoring all students' learning of the rules and procedures. Misbehavior was stopped quickly and firmly but not harshly.

In the *poorly managed classrooms*, the first weeks were quite different. Rules were not workable; they were either too vague or very complicated. For example, one teacher made a rule that students should "be in the right place at the right time." Students were not told what this meant, so their behavior could not be guided by the rule. Neither positive nor negative behaviors had clear, consistent consequences. After students broke a rule, ineffective managers gave a vague criticism, such as "Some of my children are too noisy," or issued a warning but did not follow through with the threatened consequence.

In the poorly managed classes, procedures for accomplishing routine tasks varied from day to day and were never taught or practiced. Instead of dealing with these obvious needs, ineffective managers spent time on procedures that could have waited. For example, one teacher had the class practice for a fire drill the first day but left unexplained other procedures that would be needed every day. Students wandered around the classroom aimlessly and had to ask each other what they should be doing. Often the students talked to one another because they had nothing productive to do. Ineffective teachers frequently left the room. Many became absorbed in paperwork or in helping just one student. They had not made plans for how to deal with late-arriving students or interruptions. One ineffective manager tried to teach students to respond to a bell as a signal for attention but later let the students ignore it. All in all, the first weeks in these classrooms were disorganized and filled with surprises for teachers and students alike.

EFFECTIVE MANAGERS FOR SECONDARY STUDENTS. What about getting started in a secondary school class? It appears that many of the differences between effective and ineffective elementary school teachers are the same at the secondary level. Again, *effective managers* focus on establishing rules, procedures, and expectations on the first day of class. These standards for academic work and class behavior are clearly communicated to students and consistently enforced during the first weeks of class. Student behavior is closely monitored, and infractions of the rules are dealt with quickly. In classes with less prepared students, work cycles are shorter; students are not required to spend long, unbroken periods on one type of activity. Instead, during each period, they are moved smoothly through several different tasks. In general, effective teachers carefully follow each student's progress, so students cannot avoid work without facing consequences (Emmer & Evertson, 2017).

With all this close monitoring and consistent enforcement of the rules, you may wonder if effective secondary teachers have to be grim and humorless. Not necessarily. As any experienced teacher can tell you, there is much more to smile about when the class is cooperative. For more ideas about getting started on the first day of class, see the helpful book by Harry and Rosemary Wong, *The First Days of School: How to Be an Effective Teacher* (5th ed., 2018).

Module 40 Summary

The What and Why of Supportive Classroom Organization (pp. 558–562)

What are the challenges of classroom management? As you learn to teach, you should be aware of your philosophy of classroom management. Are you more teacher centered and structured or more student centered and humanistic? Classrooms are challenging because they are multidimensional, full of simultaneous activities, fast-paced and immediate, unpredictable, public, and affected by the history of students' and teachers' actions. A teacher must juggle all these elements every day. Productive classroom activity requires students' cooperation. Maintaining cooperation is different for each age group. Young students are learning how to "go to school" and need to learn the general procedures of school. Older students need to learn the specifics required for working in different subjects. Working with adolescents requires teachers to understand the power of the adolescent peer group.

What are the goals of effective classroom organization and management? The goals of effective classroom organization and management are to make ample time for learning; improve the quality of time used by keeping students actively engaged; make sure participation structures are clear, straightforward, and consistently signaled; develop positive relationships with students; and encourage student self-management, self-control, and responsibility.

Creating a Positive Learning Environment (pp. 562–573)

Distinguish between rules and procedures. Rules are the specific dos and don'ts of classroom life. They usually are written and posted. Procedures cover administrative tasks, student movement, housekeeping, and routines for accomplishing lessons, interactions between students and teachers, and interactions among students. Rules can be written in terms of rights, and students may benefit from participating in establishing these rules. Consequences should be established for following and breaking the rules and procedures so that the teacher and the students know what will happen. Rules, procedures, and consequences must fit the situation—in-person versus remote learning.

Distinguish between personal territories and interest-area spatial arrangements. There are two basic kinds of spatial organization: territorial (the traditional classroom arrangement) and functional (dividing space into interest or work areas). Flexibility is often the key. Access to materials, convenience, privacy when needed, ease of supervision, symbolic messages communicated, and a willingness to reevaluate plans are important considerations in the teacher's choice of physical arrangements.

Contrast the first school week of effective and ineffective classroom managers. Effective classroom managers spend the first days of class teaching a workable, easily understood set of rules and procedures by using lots of explanation, examples, and practice. Students were occupied with organized, enjoyable activities, and they learned to function cooperatively in the group. Quick, firm, clear, and consistent responses to infractions of the rules characterized effective teachers. The teachers had planned carefully to avoid any last-minute tasks that might have taken them away from their students. These teachers dealt with the children's pressing concerns first. In contrast, for ineffective managers, procedures for accomplishing routine tasks varied from day to day and were never taught or practiced. Students talked to one another because they had nothing productive to do. Ineffective teachers frequently left the room. Many became absorbed in paperwork or in helping just one student. They had not made plans for how to deal with typical problems such as late-arriving students or interruptions.

MODULE 41 What Now? Maintaining a Positive Context for Learning

Learning Objective 13.3 Discuss how to maintain a positive learning environment by encouraging student engagement, preventing problems, and developing caring, respectful relationships with your students.

Maintaining a Good Environment for Learning

A good start is just that—a beginning. Effective teachers build on this beginning. They maintain their management system by preventing problems and keeping students engaged in productive learning activities. We have discussed several ways to accomplish these goals. In Cluster 12, on motivation, for example, we considered stimulating curiosity, relating lessons to student interests, establishing learning goals instead of performance goals, and having positive expectations. What else can teachers do?

Encouraging Engagement

Stop & Think What activities keep you completely engaged—the time just seems to disappear? What is it about those activities that keeps you focused?

In general, as teacher supervision increases, students' engaged time also increases. Obviously, this has implications for remote learning when students are entirely on their own. This does not mean that teachers should eliminate independent work for students. It simply means that this type of activity usually requires careful planning and monitoring. Activities with clear steps are likely to be more absorbing because one step leads naturally to the next. When students have all the materials they need to complete a task, they tend to stay involved. And, as you now know, students will be more engaged if they are involved in authentic tasks—activities that have connections to real life. Also, activities are more engaging when the level of challenge is higher (Emmer & Gerwels, 2006).

Of course, teachers can't supervise every student all the time or rely on challenge to keep students motivated. In their study of elementary and secondary teachers, Evertson, Emmer, and their colleagues found that effective class managers at all levels had well-planned systems for encouraging *students to manage their own work* (Emmer & Evertson, 2017; Evertson & Emmer, 2017). The *Guidelines: Keeping Students Engaged* on the next page are based on their findings.

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Promoting Student Engagement (I, C4)

A principle of educational psychology is that the more students are cognitively engaged in an activity, the more they are likely to learn. What tactics can teachers employ to maximize their students' cognitive engagement during learning tasks?

GUIDELINES

Keeping Students Engaged

Make basic work requirements clear.

Examples

1. Specify and post the routine work requirements for headings, paper size, pen or pencil use, and neatness.
2. Establish and explain rules about late or incomplete work and absences. If a pattern of incomplete work begins to develop, deal with it early; speak with parents if necessary.
3. Make due dates reasonable, and stick to them unless the student has a very good excuse for lateness.

Communicate the specifics of assignments.

Examples

1. With younger students, have a routine procedure for giving assignments, such as writing them on the board in the same place each day. With older students, assignments may be dictated, posted online, or given in a syllabus.
2. Remind students of upcoming assignments.
3. With complicated assignments, give students a sheet describing what to do, what resources are available, due dates, and so on. Older students should also be told your grading criteria.
4. Demonstrate how to do the assignment, do the first few questions together, or provide a sample worksheet.

Monitor work in progress.

Examples

1. When you give an assignment in class, make sure each student gets started correctly. If you check only students who raise their hands for help, you will miss those who think they know what to do but don't really understand, those who are too shy to ask for help, and those who don't plan to do the work at all.
2. Check progress periodically. In discussions, make sure everyone has a chance to respond.

Give frequent academic feedback.

Examples

1. Elementary students should get papers back the day after they are handed in.
2. Good work can be displayed in the classroom (but make sure it is not from the same students over and over), and graded papers sent home to parents each week.
3. Students of all ages can keep records of grades, projects completed, and extra credits earned.
4. For older students, break up long-term assignments into several phases, giving feedback at each point.

For more ideas, go to http://www.edutopia.org and search for "keeping students engaged."

Prevention Is the Best Medicine

The ideal way to manage problems, of course, is to prevent them in the first place—this certainly will make more time for learning. In a classic study, Jacob Kounin (1970) examined classroom management by comparing effective teachers, whose classes were relatively free of problems, with ineffective teachers, whose classes were continually plagued by chaos and disruption. Observing both groups in action, Kounin was surprised to find the teachers were NOT very different in the way they handled discipline *once problems arose*. The difference was that the successful managers were much better at preventing problems. First, these teachers captured students' attention and maintained engagement

in work that was at appropriate levels for all students. Second, these effective classroom managers were especially skilled in four specific kinds of prevention: "withitness," overlapping activities, group focusing, and movement management. More recent research confirms that expert classroom managers focus on prevention (Jones & Jones, 2016; Stahnke & Blömeke, 2021).

Withitness
According to Kounin, awareness of everything happening in a classroom.

WITHITNESS. **Withitness** means communicating to students that you are aware of everything that is happening in the classroom. "With-it" teachers seem to have eyes in the back of their heads. They avoid becoming absorbed by distractions or interacting with only a few students because this encourages the rest of the class to wander. These teachers are always scanning the room, making eye contact with individual students, so the students know they are being monitored (Charles & Cole, 2019; Romano & Weinstein, 2019).

These teachers prevent minor disruptions from becoming major. They also know who instigated the problem, and they make sure they deal with the right people. In other words, they don't make what Kounin called *timing errors* (waiting too long before intervening) or *target errors* (blaming the wrong student and letting the real perpetrators escape responsibility for their behavior).

If two problems occur at the same time, effective managers deal with the more serious one first. For example, a teacher who tells two students to stop whispering but ignores even a brief shoving match by the bookshelves communicates a lack of awareness. Students begin to believe they can get away with almost anything if they are clever.

Overlapping
Supervising several activities at once.

Group focus
The ability to keep as many students as possible involved in activities.

OVERLAPPING AND GROUP FOCUS. **Overlapping** means keeping track of and supervising several activities at the same time. For example, a teacher may have to check the work of an individual and at the same time keep a small group working by saying, "Right, go on," and stop an incident in another group with a quick "look" or reminder (Charles, 2011; Charles & Cole, 2019).

Maintaining a **group focus** means keeping as many students as possible involved in appropriate class activities and avoiding narrowing in on just one or two students. Problems arise when teachers have students work one at a time while the rest of the class waits and watches. All students should have something to do during a lesson. For example, the teacher might ask everyone to write the answer to a question, and then call on individuals to respond while the other students compare their answers. Choral responses might be required while the teacher moves around the room to make sure everyone is participating. Group focus can be especially challenging during remote learning. How will you ensure that everyone has something productive to do, even as you interact with one student or student group?

Movement management
Keeping lessons and the group moving at an appropriate (and flexible) pace, with smooth transitions and variety.

MOVEMENT MANAGEMENT. **Movement management** means keeping lessons and the group moving at an appropriate (and flexible) pace, with smooth transitions and variety. The effective teacher avoids abrupt transitions, such as announcing a new activity before gaining the students' attention or starting a new activity in the middle of something else. When transitions are abrupt, one-third of the class will be doing the new activity, many will be working on the old lesson, several will be asking other students what to do, some will be taking the opportunity to have a little fun, and most will be confused. Another transition problem Kounin noted is the *slowdown*, or taking too much time to start a new activity. Sometimes teachers give too many directions at once. Clear, well-timed directions are especially important for remote teaching because it is difficult to "read" student confusion online.

STUDENT SOCIAL SKILLS AS PREVENTION. But what about the students? What can they do? When students lack social and emotional skills such as being able to share materials, read the intentions of others, or handle frustration, classroom problems often follow. So all efforts to teach social and emotional self-regulation are steps toward preventing management problems. Over the short term, educators can teach and model these skills and then

give students feedback and practice using them in a variety of settings. Over the long term, teachers can help change attitudes that value aggression over cooperation and compromise (M. J. Elias & Schwab, 2006).

Figure 13.3 is a lesson outline that can be used to target and improve specific social skills for an individual or small group. You can see that this is an example of good teaching. There is a clear goal defined by specific and observable targets, modeling, practice with the teacher and then (very important) practice in the natural setting like the gym or lunchroom where the problem usually occurs, and finally some kind of recognition or reinforcement (Jones & Jones, 2016).

Figure 13.3 A Social Skills Lesson Design

This design can be used with individuals or groups to identify and practice targeted social skills.

Describe the inappropriate behavior _____

_____

_____

Rationale for a new behavior _____

_____

Describe the appropriate behavior _____

_____

Skill components of the new behavior _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Model demonstration example _____

_____

_____

_____

Student practice example _____

_____

_____

_____

Natural setting practice (if different than initial practice) _____

_____

_____

Independent practice assignment _____

_____

_____

Individual or group reinforcement strategy _____

_____

_____

Source: Jones, V. & Jones, L. *Comprehensive classroom management: Creating communities of support and solving problems*, Update, Loose-Leaf Version, 11th ed., p. 372. ©2016. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., New York, NY.

Caring Relationships: Connections with School

All efforts directed toward building positive relationships with students and creating a classroom community are steps toward preventing management problems.

TEACHER CONNECTIONS. Results of many studies confirm that the affective quality of teacher–student relationships, that is, whether teachers and students feel close or in conflict, is important for students' classroom engagement, academic achievement, and social-emotional development (Meyer & L. Anderman, in press). One powerful example is a study that followed 1,364 students from kindergarten through ninth grade. The students who experienced positive relationships with their teacher for the first 6 years in school had higher GPAs, enrolled in more advanced science classes, and set higher educational aspirations. They also had stronger social skills as well as higher math and English self-concepts. As the researchers noted, "… even though teachers are transient figures in students' lives, the strength and influence of these relationships can (and do) have lasting consequences" (Ansari et al., 2020, p. 9). In a study of engagement in math (Rimm-Kaufman et al., 2015), students reported working harder, enjoying math more, and sharing ideas and materials with each other more when teachers were warm, caring, and responsive to student needs. The students also reported greater cognitive, social, and emotional engagement in math learning when the teachers made learning goals clear, used proactive/preventative management strategies, and orchestrated smooth transitions (more evidence for Kounin's management strategies). Positive teacher relationships are particularly important at the transition to middle school for students who face academic risks (Hughes & Cao, 2018). In a study that followed over 1,200 students from fifth and sixth grades, Stefania Sette and her colleagues (2020) found that students who were more liked by their teacher were more likely to be included by their peers and this inclusion was associated with greater success in school. Finally, in a study of 58 high schools, when adults actively connected with students through informal greetings, questions, and conversations outside classrooms in cafeterias, hallways, and stairwells, there were fewer negative student behaviors (Cash et al., 2019).

What else supports strong relationships? Students respect teachers who maintain their authority without being rigid or harsh, are fair and honest with them, demonstrate emotional support and caring, make sure students understand the material, ask if something is wrong when they seem upset, and use creative instructional practices to "make learning fun." Students also value teachers who show academic and personal caring by acting like real people (not just as teachers), sharing responsibility, minimizing the use of external controls, including everyone, searching for students' strengths, communicating effectively, and showing an interest in their students' lives and pursuits. Finally, students like and respect teachers who show respect for their cultural identity (Meyer & L. Anderman, in press; Turner et al., 2014; Wentzel, 2002; Woolfolk Hoy & Weinstein, 2006).

EMR model
A research-based strategy for developing positive relationships with students. EMR stands for Establish-Maintain-Restore.

How can you develop positive relationships with your students? The **EMR model**, (which stands for *Establish-Maintain-Restore*), is a research-based possibility. When middle school teachers were trained to use EMR, their students were less disruptive and more engaged in academic tasks. The approach was especially helpful for students who had poor relationships with their teachers before the EMR intervention (Duong et al., 2019). In fact, when Laurie Kincade and her colleagues (2020) analyzed almost 800 studies that evaluated programs to improve teacher–student relationships, EMR was one of the two programs with the largest effects. Here are the highlights of the model:

- **Establish**—the goal is to encourage student belonging, trust, and connections by "banking time," that is, by having individual warm interactions with students that are validating. The interactions are person to person, not academic or directive. Find some common interests. Learn about the student as a person.
- **Maintain**—once established, you have to work to protect the positive relationship by striving for a 5-to-1 ratio of positive-to-negative interactions. If you find yourself criticizing or correcting more than about one time in five interactions, strive to be more positive.

- **Restore**—it is difficult to avoid conflicts or misunderstandings. When they occur, it is your responsibility as a teacher to make things right again by separating the deed from the doer, working to solve the problem together (more about this later in the cluster), validating the student's feelings, not holding a grudge, and generally being the adult in the situation.

There is more to the EMR approach than the preceding bullets. Go to http://www.edutopia.org and search for "Establish-Maintain-Restore."

Students who believe "their teachers are caring, empathic, and fair and help resolve personal problems" are more likely to feel a greater sense of *belonging* (our next topic) than those students who perceive a negative relationship with their teachers (Allen et al., 2018, p. 25).

Stop & Think Think back to your middle school days. On a 4-point scale from 1 (*Disagree*) to 4 (*Agree*), how would you have rated these three items?

1. The adults at my school like me as much as they like other students.
2. There is an adult at my school who cares about me.
3. I enjoy going to school.

How do you want your future students to answer these questions?

SCHOOL CONNECTIONS AND BELONGING. The three questions in the *Stop & Think* are from the Milwaukee Youth Belonginess Scale, developed to measure students' sense of connection to their family, peers, and school. In the *Stop & Think*, you rated the items that focused on connections to school (Slaten et al., 2019). Students who feel connected with school are happier, more engaged in schoolwork, less likely to be absent, more likely to graduate, and more self-disciplined; have higher self-efficacy; and are less likely to be involved in dangerous behaviors such as substance abuse, violence, and early sexual activity (Allen et al., 2018; Prati et al., 2018; Waters & Cross, 2010). If students perceive their schools are competitive places where they are treated differently based on race, gender, or ethnicity, then they are more likely to act out or withdraw altogether. But when they feel that they have choices, that the emphasis is on personal improvement and not comparisons, and that they are respected and supported by teachers, students are more likely to bond with schools (Osterman, 2000; Schachner et al., 2019). One way of supporting belonging in school is by connecting with students' families and home lives (Gage et al., 2016). For example, students in China describe their teachers as high on caring. This may be because Chinese teachers spend quite a bit of time in students' homes, learning about their home life, and offering help outside school. These teachers show respect for the families and cultures of their students by their willingness to visit and to help (Jia et al., 2009; Suldo et al., 2009).

CREATING COMMUNITIES OF CARE FOR ADOLESCENTS. The transition to high school is a particularly important time to maintain caring teacher–student relationships. Students have more teachers and fewer close relationships with teachers, just at a time when emotional, social, and academic stresses are increasing. Feeling a sense of belonging is important for all students, but particularly for students who may, because of language, race, gender, or poverty, feel disconnected from the basically White middle-class culture of most schools (Gray et al., 2018). In one study that followed 572 students from ninth grade through high school, Cari Gillen-O'Neel and Andrew Fuligni (2013) found that girls' sense of belonging in school was higher than boys' in ninth grade, but over the high school years, this connection declined for girls but not for boys. One possible reason is that boys participate more often than girls in extracurricular activities such as sports; these activities connect them to the school. So encouraging girls to participate in school activities, including sports, may build a sense of belonging for them. In addition, having positive relationships with students appears to support *teachers'* sense of

well-being. When we remember the basic human need for relatedness—the feeling that others care about you described in Cluster 12—we can understand why caring relationships in school would support both students' sense of belonging and teachers' well-being (Spilt et al., 2011).

Check & Connect, developed at the University of Minnesota, is one program that has been successful in developing caring relationships with disengaged, marginalized adolescents, although it can be used with students of all ages. A goal of Check & Connect is "to foster school completion with academic and social competence" (http://checkandconnect.umn.edu). The program works by developing a relationship between a trained mentor and students. The mentor *checks* on the students, monitoring their attendance, behavior, and grades, and *connects* with students by offering individualized interventions in partnership with other school staff, families, and community resources. Results of research on Check & Connect show that the program improves student engagement and achievement (Anderson et al., 2004; Skiba et al., 2016).

When Randall Sampson, one of my former graduate students, became the assistant principal of a large, diverse high school in Columbus, Ohio, he initiated something similar to Check & Connect. He personally monitored those students who had completed basic math classes with grades good enough to move to advanced placement classes but who had not signed up for the classes. He contacted the students' parents, talked to the students, and signed them up for the advanced classes. Then he checked in on them every week to be sure they were engaged in class. His interventions were very successful, leading to a 600% increase in Black students enrolled in AP classes and a 35% increase in AP exam scores. His initiatives kept some potentially disengaged students on track for college admission when the students and their families had not considered college a possibility. Randall founded Liberty Leadership Development (http://www.LibertyLD.com) to bring these kinds of positive interventions to more schools such as Wilson Preparatory Academy in North Carolina (http://www.wilsonpreparatoryacademy.org). But beware. Just having a mentor will not necessarily be helpful for a student unless the relationship is strong, as Randall's was with the students he supported. Having a poor-quality relationship with a mentor can actually be detrimental (Lyons & McQuillin, 2019).

See the *Guidelines: Creating Caring Relationships* for more ideas, many taken from Jones and Jones (2016) and M. Marshall (2013).

GUIDELINES

Creating Caring Relationships

Get to know students as individuals.

Examples

1. Eat lunch with a different group of students every day; work with a club, extracurricular activity, or sports group; attend student activities.
2. When learning is remote, make sure every student has contact with at least one adult from the school each day. Enlist teachers, librarians, reading specialists, counselors, and teacher's aides. If students do not have Internet, call on the phone.
3. Show your interest in your students as individuals.
4. Schedule individual conferences with students. If you are teaching remotely, have virtual office hours and make sure you meet with the students who seem to disappear or don't seek your help.
5. As we noted earlier, if you are starting the year with remote learning and your students have video access, do an introductory video of yourself and ask students to do the same—have students pronounce their names so all can learn.

Communicate your respect for students' abilities.

Examples

1. "Model respect for diversity—by expressing admiration for a student's bilingual ability, by commenting enthusiastically about the number of different languages that are represented in the class, and by including examples and content from a variety of cultures" (C. S. Weinstein et al., 2003, p. 272).
2. Comment to students privately and positively about your observations of their performances in extracurricular activities.
3. Encourage students to use personal interests as a subject for their writing.
4. Greet students at the door to the class every day.

Keep communications authentic but professional.

Examples

1. Send brief personal notes to students acknowledging a good job performed on assignments, their hard work and persistence, a birthday, or concern about absences. Include a get-well card along with homework sent to a student who is ill.
2. Share some stories from your own life as examples of excitement about a subject, making mistakes (and learning from them), and persistence and overcoming difficulties.
3. Do not friend students on social media, and be very careful about your language and picture postings in all electronic communications—many things can be misinterpreted. Create school-related email accounts that are different from your personal accounts.
4. Check with your school policy about sharing personal information such as religion, sexual orientation, or political views.
5. If you are meeting alone with a student, do so in an area visible to others—sadly, teachers today must protect against having their positive relationships with students misinterpreted by others or by the student.

Seek student input and respect it, but don't take it too personally.

Examples

1. Consider a suggestion box or community meetings for younger students.
2. Listen to student concerns and complaints without getting defensive. Ask for suggestions, but also share your rationales for assignments and grades.
3. Ask students directly for anonymous feedback about whether they feel respected and cared for in your class. Use simple questionnaires that don't reveal the identity of the student through handwriting. Consider asking students to rate the three items found in the previous *Stop & Think* exercise.

Module 41 Summary

Maintaining a Good Environment for Learning (pp. 574–581)

How can teachers encourage engagement? In general, as teacher supervision increases, students' engaged time also increases. When the task provides continuous cues for the student about what to do next, involvement will be greater. Activities with clear steps are likely to be more absorbing because one step leads naturally to the next. Making work requirements clear and specific, providing needed materials, and monitoring activities all add to engagement.

Explain the factors identified by Kounin that prevent management problems in the classroom. To create a positive environment and prevent problems, teachers must take individual differences into account, maintain student motivation, and reinforce positive behavior. Successful problem preventers are skilled in four areas described by Kounin: "withitness," overlapping, group focusing, and movement management. When penalties have to be imposed, teachers should impose them calmly and privately. In addition to applying Kounin's ideas, teachers can prevent problems by establishing a caring classroom community and teaching students to use social skills and emotional self-regulation skills.

How do teachers help students form connections with schools, and why are these connections important? The affective quality of teacher–student relationships, that is, whether teachers and students feel close or in conflict, affects students' classroom engagement, academic achievement, and social-emotional development. To get started on building connections, teachers should make expectations for both academic work and student behaviors clear. Respect for students' needs and rights should be at the center of class procedures. Students know that their teachers care about them when teachers try to make classes interesting, are fair and honest with them, make sure they understand the materials, and have ways to cope with students' concerns and troubles. The EMR model (Establish-Maintain-Restore) and Check & Connect are two examples of successful programs.

MODULE 42 Positive Response to Problems, Communication, and Connection

Learning Objective 13.4 Identify strategies (especially penalties and alternatives, restorative justice, and student self-discipline) for preventing and addressing student misbehaviors, including bullying.

Learning Objective 13.5 Characterize successful teacher–student and student–student communication through such approaches as empathetic listening, I-messages, and problem solving.

Learning Objective 13.6 Explain the need for and approaches to culturally relevant classroom management.

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Student Misbehavior (I, C4)

Even the most well-managed classroom will have instances of student misbehavior. Explain the principles for dealing with common student misbehaviors. What strategies can teachers employ to deal fairly and effectively with those problems?

Dealing with Discipline Problems

Before we even discuss dealing with discipline problems, remember that every school has policies and procedures for handling behavior problems, especially more serious issues. Make sure you know all these procedures and requirements before you develop your management plan. Also keep in mind that being an effective manager does not mean publicly correcting every minor infraction of the rules. This kind of public attention may actually reinforce the misbehavior, as we saw in Cluster 7. The key is being aware of what is happening and knowing what is important so you can prevent problems.

Stopping Problems Quickly

It is critical that you have many effective ways to *de-escalate* rather than escalate student behavior problems. As problems escalate, students may need to save face in front of their peers by challenging or defying the teacher. This can lead to excluding students from class, sending them to detention, or suspension—all outcomes that place students, especially students of color, at greater risk of negative or dangerous outcomes such as disengaging from school or getting caught up in the juvenile justice system and the school-to-prison pipeline (Hwang, 2018; Skiba et al., 2016).

It may help you to be more effective at de-escalating problems if you approach students' social/behavioral problems more like you would academic problems—as an opportunity to learn a better way. For example, generally when students make an academic mistake we assume that they were trying to get it right and did not make the mistake on purpose. They just need smaller steps, clearer explanations, better examples, models, or practice. But when the problem is behavioral, we often assume the student is not trying or that the error was intentional. We follow with criticisms, punishments, or exclusion from the class. Successful teachers tend to see their role in improving behavior as interpersonal and instructional—helping their students learn and practice better decisions and actions. Your attributions

about the problem—whether it was a mistake or intentional—matter (Jones & Jones, 2016; Stahnke & Blömeke, 2021).

Most students comply quickly when the teacher redirects behavior or gives a *desist* (a "stop doing that") instruction. But some students are the targets of more than their share of desists. Emmer and Evertson (2017) and Levin and Nolan (2000) suggest eight simple ways to stop misbehavior quickly, moving from least to most intrusive:

- *Make eye contact* with or move closer to the offender. Other nonverbal signals, such as pointing to the work students are supposed to be doing, might be helpful. Make sure the student actually stops the inappropriate behavior and gets back to work. If you do not, students will learn to ignore your signals.
- *Try verbal hints* such as "name-dropping" (simply insert the student's name into the lecture), asking the student a question, or making a humorous (not sarcastic) comment such as "I must be hallucinating. I haven't called on anyone, and yet I am hearing voices!"
- *Ask students* if they are aware of the negative effects of their actions, or send an I-message, described later in the cluster.
- Involve the whole class in *a brief interactive activity* such as "Think-Pair-Share." Especially if more than one student is "drifting," this activity can reengage the drifters.
- If they are not performing a class procedure correctly, *remind the students* of the procedure, and have them follow it correctly. You may need to quietly collect a toy, comb, cell phone, or note that is competing with the learning activities while privately informing the students that their possessions will be returned after class. You also could put a sticky note on the student's desk inviting the student to talk with you after the lesson is over.
- In a calm, unhostile way, ask the student to *state the correct rule or procedure* and then to follow it. Glasser (1969) proposes three questions: "What are you doing? Is it against the rules? What should you be doing?"
- *Tell the student* in a clear, assertive, and unhostile way to stop the misbehavior. (Later in the cluster, we will discuss assertive messages to students in more detail.) If students "talk back," simply and calmly repeat your statement.
- *Offer a choice.* For example, when a student continued to call out answers no matter what the teacher tried, the teacher said, "John, you have a choice. Stop calling out answers immediately and begin raising your hand to answer or move your seat to the back of the room and you and I will have a private discussion later. You decide" (Levin & Nolan, 2000, p. 177).

If You Impose Penalties

Many teachers prefer the use of *logical consequences*, described earlier, as opposed to penalties. For example, if one student has harmed another, you can require the offending student to make an "apology of action," which includes a verbal apology plus somehow repairing the damage done. This helps offenders develop empathy and social perspective taking as they think about what would be an appropriate "repair" (M. J. Elias & Schwab, 2006).

If you must impose penalties, again, start with the least intrusive and move on only when you have to. In their case studies of four expert elementary school teachers, Romano and Weinstein (2019) found that the teachers' penalties fell into seven categories, as shown in Table 13.2.

Table 13.2 Seven Categories of Penalties for Students

1. *Expressions of disappointment.* If students like and respect their teacher, then a serious, sorrowful expression of disappointment may cause students to stop and think about their behavior.
2. *Loss of privileges. Students can lose free time.* If they have not completed homework, for example, they can be required to do it during a free period or recess.
3. *Time-out: Exclusion from the group.* Students who distract their peers or fail to cooperate can be separated from the group until they are ready to cooperate. Some teachers give a student a pass for 10 to 15 minutes. The student must go to another class or study hall, where the other students and teachers ignore the offending student for that time.
4. *Written reflections on the problem.* Students can write in journals, write essays about what they did and how it affected others, or write letters of apology—if this is appropriate. Another possibility is to ask students to describe objectively what they did; then the teacher and the student can sign and date this statement. These records are available if parents or administrators need evidence of the students' behavior.
5. *Visits to the principal's office.* Expert teachers tend to use this penalty rarely, but they do use it when the situation warrants. Some schools require students to be sent to the office for certain offenses, such as fighting. If you tell a student to go to the office and the student refuses, you might call the office saying the student has been sent. Then the student has the choice of either going to the office or facing the principal's penalty for "disappearing" on the way.
6. *Detentions.* Detentions can be very brief meetings after school, during a free period, or at lunch. The main purpose is to talk about what has happened.
7. *Contacting parents.* If problems become a repeated pattern, most teachers contact the student's family. This is done to seek support for helping the student, not to blame the parents or punish the student.

Source: From *Elementary classroom management* (7th ed.), pp. 300–301, by M. E. Romano and C. S. Weinstein. McGraw-Hill. Copyright © 2019 by The McGraw-Hill Companies. Adapted with permission of The McGraw-Hill Companies, Inc.

There is a caution about penalties. As Carolyn Orange (2005) notes, "Effective, caring teachers would not use low achievement status, grades, or the like as a means of discipline. This strategy is unfair and ineffective. It only serves to alienate the student" (p. 76). If you must impose penalties, the *Guidelines: Imposing Penalties* give ideas about how to do it. Some of these examples are based on ideas from expert teachers described by Weinstein and Novodvorsky (2015) and Romano and Weinstein (2019).

GUIDELINES

Imposing Penalties

Delay the discussion of the situation until you and the students involved are calmer and more objective.

Examples

1. Say calmly to a student, "Sit there and think about what happened. I'll talk to you in a few minutes" or "I don't like what I just saw. Talk to me during your free period today."
2. Say, "I'm really angry about what just happened. Everybody take out journals; we are going to write about this." After a few minutes of writing, the class can discuss the incident.

Impose penalties privately.

Examples

1. Make arrangements with students privately. Stand firm in enforcing arrangements.
2. Resist the temptation to "remind" students in public that they are not keeping their side of the bargain.
3. Move close to a student who must be disciplined and speak so that only the student can hear.

After imposing a penalty, reestablish a positive relationship with the student immediately.

Examples

1. Send the student on an errand, or ask him or her for help.
2. Compliment the student's work, or give a symbolic "pat on the back" when the student's behavior warrants. Look hard for such an opportunity.
3. For 2 minutes each day for 10 days in a row, have a personal conversation with the student about something of interest to him or her—sports, games, films—make an effort to know what those interests are. This investment in time can pay off by regaining learning time for the student and the entire class.

Set up a graded list of penalties that will fit many occasions.

Example

1. For not turning in homework: (a) receive reminder; (b) receive warning; (c) hand homework in before close of school day; (d) stay after school to finish work; (e) participate in a teacher–student–parent conference to develop an action plan.

Always teach problem-solving strategies along with penalties to help students learn what to do next time (M. J. Elias & Schwab, 2006).

Examples

1. Use Problem Diaries, where students record what they were feeling, identify the problem and their goal, and then think of other possible ways to solve the problem and achieve the goal.
2. Try Keep Calm 5–2–5: At the first physical signs of anger, students say to themselves, "Stop. Keep Calm," and then take several slow breaths, counting to 5 breathing in, 2 holding breath, and 5 breathing out.

What About School Suspensions and Zero Tolerance?

There is quite a bit of discussion today about school suspensions and zero-tolerance penalties for rule breaking in the schools. Is this a good idea? The *Point/Counterpoint: Is Zero Tolerance a Good Idea?* looks at both sides.

POINT/COUNTERPOINT: Is Zero Tolerance a Good Idea?

With the very visible violence in schools today, some districts have instituted "zero-tolerance" policies for rule breaking. This usually means expelling or suspending students the first time they break a rule. It also can mean punishing minor rule infractions every time, hoping to deter major infractions in the future. Do zero-tolerance policies make sense?

Point

Zero tolerance is necessary for now. The arguments for zero tolerance focus on school safety, fairness, preparation for the future, and the responsibilities of schools and teachers to protect the students and themselves. Educators argue that zero-tolerance policies set clear expectations and allow for fast responses to misbehavior. These approaches keep students safer and create a less chaotic learning environment. Zero tolerance for all reduces favoritism because everyone must be treated the same way, but as we will see later, this does not always happen. Also, advocates of zero tolerance claim that these policies prepare students for the real world where, for example, police don't care why you were speeding or your boss may not care why you were late (Morin, 2020; Sasser, 2017). Of course, many of the incidents reported in the news seem like overreactions to childhood pranks or, worse, to

(Continued)

innocent mistakes or lapses of memory. But how do school officials separate the innocent from the dangerous? For example, it has been widely reported that Andy Williams (the boy who killed two classmates in Santee, California) assured his friends before the shootings that he was only joking about "pulling a Columbine."

Schools also claim that having zero-tolerance policies has cut down on the number of drugs in schools because having exceptions can lead to having no clear rules at all. Finally, parents are in favor of these policies (Sasser, 2017).

Counterpoint

Zero tolerance makes zero common sense. An Internet search using the keywords "zero tolerance" and "schools" will locate a wealth of information about the policy—much of it against. For example, what sense does this story make? The newspaper *St. Petersburg Times* described a 10-year-old girl whose mother packed a plastic knife in the girl's lunchbox so she could cut her apple. The girl dutifully handed the plastic knife over to her teacher and was expelled from school for possession of a weapon. In another case, a teenage boy was also expelled. He broke the "no cell phone use" rule for talking to his mother, a soldier stationed in Iraq. He had not spoken to her for a month (Hyder & Hussain, 2015).

Even though supporters of zero tolerance say that these policies create fairness because punishments must be consistent, often athletes and good students are forgiven and Black adolescents are punished more often and more harshly for even minor infractions (Amemiya et al., 2020; Curwin, 2015). In addition, punishment and zero-tolerance policies have not been very successful in preventing major infractions including bullying, even though they are used often (Amemiya et al., 2020; Rigby, 2012; Welsh & Little, 2018). The American Psychological Association's Zero Tolerance Task Force (2008) reached the following conclusions:

- Schools are not any safer or more effective in disciplining students now than before they instituted zero tolerance.
- The higher rates of suspension caused by zero tolerance have not led to less racial bias in disciplining students.
- Zero-tolerance policies can actually lead to increases in bad behavior that then lead to higher dropout rates.

In addition, zero-tolerance policies can discourage students from informing teachers when the students learn that a classmate is "planning to do something dangerous." The zero-tolerance rules get in the way of trusting relationships between teachers and students (Syvertsen et al., 2009).

Beware of Either/Or

Surely we can ask adults to use good judgment in applying rules in dangerous situations but to not feel trapped by the rules when student actions are not intended to harm and are not dangerous. Whole-school policies that are less punitive and more preventative and proactive and that improve the climate of the school are good alternatives to zero tolerance. Restorative justice is one option.

Reaching Every Student: Restorative Justice

Restorative justice
A system of dealing with student misconduct that focuses on building, nurturing, and repairing relationships while giving a voice to victims, offenders, and the community.

Many schools around the world and in the United States and Canada are seeking alternatives to punitive, rigid zero-tolerance systems. One possibility is **restorative justice**—an approach that teaches lifelong lessons.

In the school where you teach, you might encounter a program called *restorative interventions*, *restorative practices*, *restorative measures*, *restorative approaches*, *restorative discipline*, or *restorative justice*—look for "restorative" (Gonzalez et al., 2018). In restorative justice, a problem behavior is harmful not because it "breaks a rule" but rather because the negative action adversely affects members of the classroom and school

community (Fronius et al., 2016). Restorative justice focuses on building, nurturing, and repairing relationships while giving a voice to victims, offenders, and the community. The goal is to reduce reliance on traditional punishments and police involvement, repair the harm to victims, but still hold misbehaving students accountable while supporting them and reintegrating them into the community. Vincent Anfara Jr. and his colleagues (2013) describe seven principles that guide restorative justice:

Meeting needs: As in functional behavioral assessment (Cluster 7), the assumption is that behaviors, even negative behaviors, have goals. Students are trying to meet some need, even if their way of reaching the goal or meeting the need is a problem. See Table 13.4 later in this cluster for some reasons for bullying.

Responsibility and accountability with support and compassion: Students take responsibility for the harm they caused in a supportive community.

Making things right: Harm is defined not as "breaking a rule" but as hurting members of the community. The appropriate response is to make things right.

Conflict is a learning opportunity: Everyone in the school community can learn to handle conflict more productively. Students become better problem solvers and teachers learn better ways of relating to their students.

Building healthy communities: Beyond responding to misbehavior, restorative justice builds respectful communities where relationships are strengthened.

Restoring relationships: Even in the strongest communities, conflict happens. Rather than punish, the goal is to repair and restore.

Addressing power imbalances: Restorative justice requires schools to examine whether their practices are causing harm to students and perpetuating injustice.

There are different ways to implement restorative justice at the school or classroom levels, including victim–offender mediation, conferencing to resolve conflict, or peacemaking circles (Parker & Bickmore, 2020; Zehr et al., 2015). For example, in a victim–offender mediation, the participants might meet with a facilitator (often the teacher) and sometimes members of their family. The victim and the offender express their views and describe their experiences, with monitoring by the facilitator to keep discussions productive. When the process works well, the participants express remorse for hurting each other, forgive the perceived transgressions, and reconcile their conflict. The outcome of restorative justice usually is an agreement that includes how to reestablish cooperation and participation in the classroom community—perhaps an apology of action, restitution, and a plan for dealing positively with possible future conflicts. See Christen Dillon's description in the Casebook responses on page 603–604. Restorative justice emphasizes student responsibility, as does the next approach, Discipline Without Stress—a goal for every teacher!

Teacher-Imposed Penalties Versus Student Responsibility

Marvin Marshall (2013) believes that even though classroom management is the responsibility of the teacher, discipline is really the responsibility of the student. Classroom management is about how things are done in the classroom and involves procedures, routines, and structures—the teachers' responsibility. Discipline is about how people behave and involves self-control and emotional self-regulation—the student's responsibility. Students must discipline themselves to be self-regulated learners and ultimately productive, successful, happy adults. A focus on obedience and teacher-imposed penalties often results in resistance, resentment, cheating, and even defiance, but a focus on responsibility creates a classroom community and a culture of learning.

Of course, anyone who has worked with children or adolescents knows that self-discipline is not automatic—it must be taught and practiced like any other skill. Marshall describes strategies for achieving these goals that focus on (a) communicating in positive terms and using "when–then" contingencies ("When you finish your work, then

you can listen to music on your phone"); (b) offering choices and eliciting consequences from students ("What shall we do about . . .?"); and (c) encouraging reflection and self-evaluation. One approach that incorporates these three principles is to teach students a hierarchy of behaviors using explanations and examples. The hierarchy is:

- Level **A: A**narchy—Aimless, chaotic.
- Level **B: B**ossing/**B**ullying—Breaking laws and making your own standards; obeying only when the enforcer has more power or authority.
- Level **C: C**ooperation/**C**onformity—Complies with expectations, conforms to peer influence.
- Level **D: D**emocracy—Self-disciplined, initiative, responsibility for your own actions.

The behaviors at levels C and D may look the same on the outside, but the difference is the motivation. For example, if a student picks up a piece of trash on the floor because the teacher asks (external motivation), the level is C (cooperation), but if the student picks up the trash without being asked (internal motivation), the level is D (democracy and self-discipline). When a student does not act at least at level C or D, the teacher asks, "What level was that behavior?" If the student does not move to at least level C and cooperate, the teacher might ask him or her to self-reflect and write an essay that addresses three questions: What did I do? What can I do to prevent it from happening again? What will I do now?

Figure 13.4 summarizes Marshall's model. His book *Discipline Without Stress® Punishments or Rewards: How Teachers and Parents Promote Responsibility & Learning* (M. Marshall, 2013) has many other strategies to encourage student self-discipline.

Bullying and Cyberbullying

Bullying is not just aggression or fighting. *Bullying* is intentional and repeated harmful behavior toward a victim. The goal is to achieve social dominance through intense, systematic abuse of physical or social power (Kaufman, et al., 2020). Cyberbullying adds the possibility to attack anonymously, so being more physically or socially powerful may be less of a factor. Also, with cyberbullying, a vast public audience can be involved, whereas other forms of bullying often have fewer witnesses.

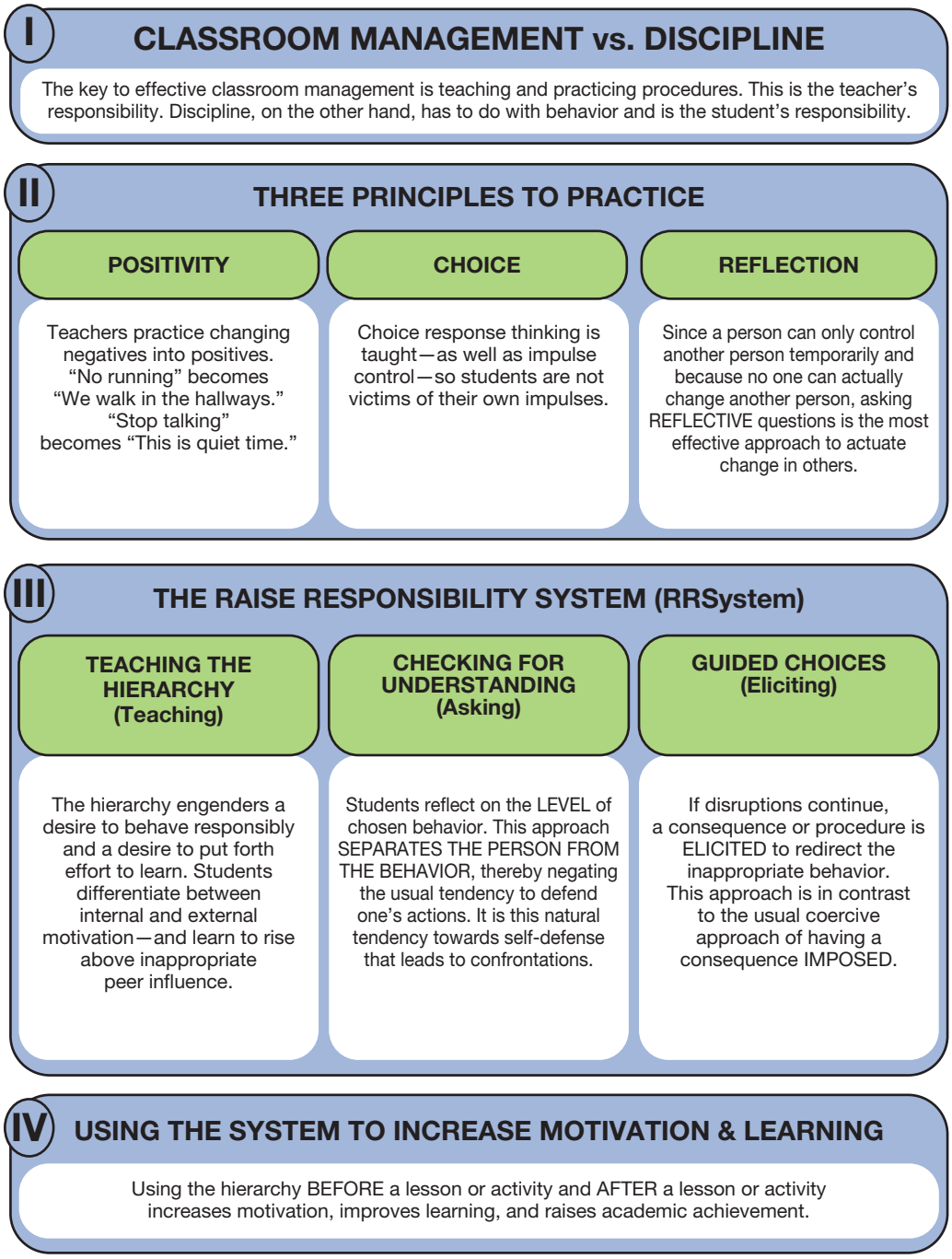
The line between good-natured exchanges and hostile teasing may seem thin, but a rule of thumb is that teasing someone who is less powerful or less popular or using any racial, ethnic, impairment, or religious slur should *not* be tolerated. Bullying can begin as early as preschool, generally peaks during middle school, and then declines a bit by the end of high school—which means bullying could be a problem in any grade you teach. Both bullies and victims are at risk for long-term academic, psychological, and behavioral problems, including drug use (Hymel & Swearer, 2015; Patton et al., 2013; Thomas et al., 2015; Ttofi et al., 2016).

There are many ways to be a bully, as you can see in Table 13.3 on page 590. For students in grades 4 through 12, about 31% report being physically bullied, 51% verbally bullied, 37% socially bullied, and 12% cyberbullied, but some studies have found as many as 80% of students report being bullied in some way. Rates of physical bullying appear to be going down, but rates of cyberbullying are going up (Graham, 2016; Hymel & Swearer, 2015).

VICTIMS. Studies from both Europe and the United States indicate that about 12% of boys and 6% of girls are chronic victims of bullying—the constant targets of physical or verbal attacks from ages 8 to 16, the longest time period measured so far (Hymel & Swearer, 2015). One kind of victim tends to have low self-esteem and to feel anxious, lonely, insecure, and unhappy. They often are prone to crying and withdrawal; in general, when attacked, they won't defend themselves. These victims may believe that they are rejected because they have flaws that they cannot change or control—no wonder they are depressed and helpless! In addition, students who are different from the larger peer group are more likely to be bullied, including students who are obese or small, unpopular, or members of ethnic or

Figure 13.4 The Discipline Without Stress® Teaching Model

Here are the key concepts in Marshall's (2013) model.



Source: Reprinted with permission from Marshall, M. (2013). *Discipline Without Stress® punishments or rewards: How teachers and parents promote responsibility & learning* (2nd ed.). Piper Press.

language minorities, as well as students who are gifted, have disabilities, or are lesbian, gay, bisexual, transgender, and questioning (LGBTQ). Unfortunately, many victims go on to become bullies themselves, creating a continuing supply of victimizers and victims (Graham, 2016; J. S. Hong & Garbarino, 2012; Walters & Espelage, 2018).

Prolonged bullying has negative effects on the academic achievement, social relationships, and mental health of the victims. Children who have been chronic victims through

Table 13.3 What Does Bullying Look and Sound Like?

TYPE OF BULLYING	DESCRIPTION	BEHAVIORS THAT COUNT AS BULLYING
Physical Bullying	Any unwanted physical contact in which one participant exerts power or force over another	Hitting, pinching, punching, kicking, shoving; withholding/stealing/destroying property
Verbal Bullying	Any comment considered offensive or threatening to the victim	Hurtful teasing, name-calling, criticizing, humiliating, taunting, threatening, making derogatory comments about any aspect of the individual (see also identity and sexual bullying in this table)
Social/Relational Bullying	Intentional manipulation of people's social lives, friendships, or reputation	Leaving people out on purpose, spreading rumors, convincing others not to be friends with someone, damaging friendships or reputations, setting someone up to look foolish
Cyberbullying	Harm by posting on Discord, Yubo, Snapchat, Twitter, Instagram, Tumblr, Monkey, WhatsApp, Houseparty, Kik, Amino, Whisper, YouNow, Reddit, BroadcastMe, Chat, Burn Note, Yik Yak, MeetMe, GroupMe, TikTok, Live.me, Omegle, email	Spreading rumors, ghosting, subtweeting, griefing, creating fake accounts in someone else's name, hate speech; inflicting all verbal bullying possibilities listed above and sending to many individuals 24/7; texting embarrassing/compromising pictures or videos; see http://www.commonsensemedia.org and search for "cyberbullying" for more information
Identity Bullying	Leaving people out or treating them badly because of their racial or ethnic background, religion, or disability	Calling racist names; telling jokes that mock race, religion or disability; making negative comments about race, religion, religious beliefs, or disability; taunting; intentionally making someone feel uncomfortable
Sexual Bullying	Leaving individuals out, treating them badly, or making them feel uncomfortable because of their sex	Making sexist comments or jokes, touching, pinching, grabbing in a sexual way; making crude comments about someone's sexual behavior or orientation; spreading sexual rumors

Source: Based on http://www.prevnet.ca/bullying/types.

elementary and middle school are more depressed and more likely to attempt suicide as young adults. Signs that students, like the boy in the opening case, are being bullied include anxiety, depression, headaches, and stomachaches as well as frequent tardiness and absence from school. In fact, about 160,000 children avoid school every day and thousands more drop out of school altogether because they are always afraid (Bradshaw et al., 2013; Holland et al., 2019; Juvonen & Schacter, 2020).

Students who were victims are more likely than bullies to kill or injure others in schools (Reinke & Herman, 2002a, 2002b). In the past years, we have seen tragic consequences when bullied students turned guns on their tormentors in schools in the United States and in Europe. Having friends can help students cope with bullying. Also, being in an ethnically diverse school can lessen feelings of vulnerability, perhaps because power is divided and shared among the groups (Graham, 2016).

WHY DO STUDENTS BULLY? Ken Rigby (2012) examined the research and concluded that students bully for four main reasons. Rigby suggests that to effectively combat bullying, schools and teachers need to address the underlying motivation, not just the bullying behavior. See Table 13.4 for the reasons and possible actions.

WHAT CAN TEACHERS DO? BULLYING AND TEASING. A longitudinal study that followed a representative sample of first- through sixth-grade students for 2 years found that aggressive children whose teachers taught them conflict management strategies were moved away from a life path of aggression and violence (Aber et al., 2003). But when teachers are silent about aggression and teasing, students may "hear" the teacher's agreement with the insult (C. S. Weinstein & Novodvorsky, 2015).

So what should you do? Respond immediately when you see an incident—don't ignore it. Students often think teachers won't help and so don't bother to report bullying.

Table 13.4 Reasons for Bullying and Possible School Responses

REASONS FOR BULLYING	POSSIBLE SCHOOL AND TEACHER ACTIONS
Bullies feel annoyed or insulted or have some grievance against the victim, so they feel justified in lashing out. There may or may not be a reasonable basis for the grievance felt.	Help students read the intentions of others more accurately. Use role-plays, readings, and drama to develop the capacity to "walk in someone else's shoes." Try conflict resolution or peer mediation.
They simply enjoy putting the victim under pressure, especially if bystanders seem to find the whole situation "fun." The bullies claim it is innocent—"no big deal."	Stress with students that it is *not* fun unless the target of the aggression is genuinely laughing, too. Develop empathy through literature activities and class community building such as circle time and shared concerns; focus on what bystanders can and should do to stop bullying.
The bully believes the aggression against the victim will gain or maintain acceptance for himself or herself in a valued group. The goals are power and social dominance.	In lessons and in relations with students, emphasize making moral judgments, thinking for yourself, and resisting conformity to group pressures. Also, sensitive discussion of prejudice and homophobia can help students resist pressures from groups to harm others based on their race, ethnicity, gender identity, or language.
The bully wants something from the victim and is willing to inflict harm to get it, and/or the bully is basically sadistic—hurting other people feels good.	Restorative justice practices and community conferences may help the bullies feel genuine remorse. For older students, if the acts are criminal, there are legal sanctions.

But if teachers take an active role and if students believe their teachers will separate those involved in bullying or contact parents and the principal, they are more likely to report bullying. Check your biases and be active. Bullying of all kinds is *not* "harmless" or "just part of growing up." Use the incident as a teachable moment to talk about difficult topics and discuss why bystanders often do nothing. Finally, model an appreciation of differences and diversity (Cortes & Kochenderfer-Ladd, 2014; Graham, 2016). Also, consequences for the bullies should be clear, be stated in advance, escalate if the bullying continues, include a reflection on the situation (talking to the teacher or writing in a journal), and be meant not to humiliate the bully but rather to teach better ways of dealing with the reasons for bullying listed in Table 13.4 (Ansary et al., 2015). Remember functional behavioral assessment from Cluster 7. What does the student get out of the bullying behavior, and what is a better way to achieve that goal? Finally, in classrooms where there are positive teacher–student relationships, students show more sympathy for the victims of bullying—another good reason to establish strong emotional bonds with your students (Waasdorp et al., 2019).

One classroom approach that has proved helpful in decreasing bullying is prevention through cooperative learning. Because people tend to seek friends who share their attitudes and behavior, bullies tend to hang together and reinforce each other's actions. Also, victims often are socially isolated students with few friends. Cooperative activities that create positive interdependence to reach mutual goals can support forming new friendships and including all students. When Mark Van Ryzin and Cary Roseth (2018) used cooperative learning activities in a randomized experimental/control group design with 1,460 seventh-grade students, they found significantly less bullying and victimization among students who participated in cooperative groups.

Some well-researched school-wide bullying prevention programs have been successful. For example, the Olweus Bullying Prevention Program had good results in a large-scale study following 120 schools (grades 3–11) over 2 years (Limber et al., 2018). Unfortunately, however, the results are mixed on the effectiveness of many school-wide bullying prevention programs. Administrators often prefer to adopt anti-bullying programs that they heard about from colleagues rather than determine if there was real scientific evidence that the

programs work—and many don't (Ansary et al., 2015; Graham, 2016; Swearer et al., 2010). And even in schools that reduce bullying, if a few students are still bullied, those victims may feel worse because they believe the school is safe so it must be their fault—something is wrong with them. They become more isolated than ever and may need extra support or counseling to realize that the bullies are seeking power—it is the bullies' fault (Juvonen & Schacter, 2020).

One general approach that can be effective is involving parents. Teachers and schools can reach out to parents to work together on preventing and responding to incidents of bullying. Parents should know about school policies and how they can support school anti-bullying efforts. For this to work, parents and schools need to trust each other so they can communicate effectively (Lindstrom Johnson et al., 2019).

CYBERBULLYING. About 95% of adolescents have access to a smartphone and thus a way to bully or be bullied. Up to 70% of adolescents experience cyberbullying over the course of a year (Morin et al., 2018; Yang et al., 2020). For example, when 16-year-old Denise broke up with her boyfriend, he sought revenge by posting her email address and cell phone number on websites and blogs devoted to sex. For months, she got embarrassing and frightening phone calls and messages (Strom & Strom, 2005). Now bullies have new ways to torment victims using email, cell phones, text messaging, all the social media sites listed in Table 13.3, web blogs, and online voting booths. (More possibilities have probably appeared since I wrote this paragraph.) This kind of bullying is difficult to combat because the perpetrators can hide but damage can be long term. Table 13.5 has some ideas for dealing with cyberbullying.

Table 13.5 Ideas for Dealing with Cyberbullying

- Develop an explicit policy for acceptable in-school use of the Internet, and include it in the school handbook (or your class rules). The policy should spell out what constitutes cyberbullying and list consequences.
- Make sure that children and young people are aware that bullying will be dealt with seriously.
- Ensure that parents/guardians who express cyberbullying concerns are taken seriously.
- Explain to students that they
  - Should never share or give out personal information, PINs, passwords, phone numbers, and so on.
  - Should not delete messages; they do not have to read them, but they should show them to an adult they trust. Messages can be used to take action against cyberbullies.
  - Should not open a message from someone they don't know.
  - Should *never* reply to the message or a weblink embedded in a message.
  - Probably can block the sender's message if they are being bullied through cell phones, email, Facebook, Twitter, Snapchat, WhatsApp, instant messaging, and so on.
  - Can forward the messages to their Internet service provider.
  - Should tell an adult.
  - Should show the message to the police if it contains physical threats.
  - Should speak out against cyberbullying.
  - Should never send messages when they are angry.
  - Should never send messages they wouldn't want others to see.
- Focus some class projects on cyberbullying. For example, students in one school posted on a "Wall of Shame" cruel comments that others in the school had posted on Facebook (without identifying information). The same could be done for Twitter or other social network sites.
- Make parents aware of the fact that all of the major Internet service providers offer some form of parental controls.
- Encourage parents to keep computers in a public room in the house.
- Invite members of the local police department to come to school to speak with parents and students about proper Internet use.
- Make sure ethics are included in any computer instruction given at your school.

Source: From *Middle and secondary classroom management* (5th ed.), by C. S. Weinstein and I. Novodvorsky. McGraw-Hill. Copyright © 2015 by The McGraw-Hill Companies, p. 182. Adapted with permission of the McGraw-Hill Companies, Inc.

Special Challenges with High School Students

Quite a few secondary students never complete their schoolwork. Because students at this age have many assignments and teachers have many students, both teachers and students may lose track of what has and has not been turned in. It often helps to teach students how to use a daily planner—paper or electronic. In addition, teachers must keep accurate records. The most important thing is to enforce the established consequences for incomplete work. Do not pass a student because you know he or she is "bright enough" to pass. Make it clear to these students that the choice is theirs: They can do the work and pass, or they can refuse to do the work and face the consequences. You might also ask, in a private moment, if there is anything interfering with the student's ability to get the work done.

There is also the challenge of students who continually break the same rules, always forgetting materials, for example, or getting into fights. What should you do? Seat these students away from others who might be influenced by them. If rules are broken, be consistent in applying established consequences. Do not accept promises that they will do better next time. Teach the students how to monitor their own behavior; some of the self-regulation techniques described in Cluster 11 should be helpful. Finally, remain friendly with the students. Try to catch them in a good moment so you can talk to them about something other than their rule breaking.

A defiant, hostile student can pose serious problems. If there is an outburst, try to get out of the situation as soon as possible; everyone loses in a public power struggle. One possibility is to give the student a chance to save face and cool down by saying, "It's your choice to cooperate or not. You can take a minute to think about it." If the student complies, the two of you can talk later about controlling the outbursts. If the student refuses to cooperate, you can tell him or her to wait in the hall until you get the class started on work and then step outside for a private talk. If the student refuses to leave, send another class member for the assistant principal. Again, follow through. If the student complies before help arrives, do not let him or her off the hook. If outbursts occur frequently, you might have a conference with the counselor, family members, or other teachers. If the problem is an irreconcilable clash of personalities, the student should be transferred to another teacher.

It sometimes is useful to keep records of these incidents by logging the student's name, words and actions, date, time, place, and teacher's response. These records may help identify patterns and can prove useful in meetings with administrators, families, or special services personnel (Burden, 1995). Some teachers have students sign each entry to verify the incidents.

Fighting or destruction of property is a difficult and potentially dangerous problem. The first step is to send for help and get the names of participants and witnesses. Then remove any students who may have gathered to watch; an audience will only make things worse. Do not try to break up a fight without help. Make sure the school office is aware of the incident; usually the school has a policy for dealing with these situations. What else can you do? The *Guidelines: Handling Potentially Explosive Situations* are based on Weinstein and Novodvorsky (2015).

GUIDELINES

Handling Potentially Explosive Situations

Move slowly and deliberately toward the problem situation.

Examples

1. Walk slowly; then be as still as possible.
2. Establish eye-level position.

(Continued)

Be respectful.

Examples

1. Keep a reasonable distance.
2. Do not crowd the student. Do not get "in the student's face."
3. Speak respectfully. Use the student's name.
4. Avoid pointing or gesturing.

Be brief.

Examples

1. Avoid long-winded statements or nagging.
2. Stay with the agenda. Stay focused on the problem at hand. Do not get sidetracked.
3. Deal with less severe problems later.

Avoid power struggles.

Examples

1. Speak privately if possible; don't threaten.
2. Do not get drawn into "I won't, you will" arguments.
3. Don't make threats or raise your voice.

Inform the student of the expected behavior and the negative consequence as a choice or decision for the student to make. Then withdraw from the student and allow some time for the student to decide.

Examples

1. "Michael, you need to return to your desk, or I will have to send for the principal. You have a few seconds to decide." The teacher then moves away, perhaps attending to other students.
2. If Michael does not choose the appropriate behavior, deliver the negative consequences. ("You are choosing to have me call the principal.") Follow through with the consequence.

Source: Based on material in *Middle and secondary classroom management: Lessons from research and practice* (5th ed.), by C. S. Weinstein & I. Novodvorsky. Published by McGraw-Hill. Copyright © 2015 by McGraw-Hill. Adapted with permission from the McGraw-Hill Companies, Inc.

The Need for Communication

Put Yourself in Their Place A student says to you, "That book you assigned is really dumb—I'm not reading it!" What do you say?

Communication between teacher and students is essential when problems arise. Communication is more than "teacher talks—student listens." It is more than the words exchanged between individuals. We communicate in many ways. Our actions, movements, voice tone, facial expressions, and many other nonverbal behaviors send messages to our students. Many times, the messages we intend to send are not the messages our students receive (Jones & Jones, 2016).

Message Sent—Message Received

Teacher: Jacob, where is your homework?
Jacob: I left it in my dad's car this morning.
Teacher: Again? You will have to bring me a note tomorrow from your father saying that you actually did the homework. No grade without the note.
Message Jacob receives: I can't trust you. I need proof you did the work.

***

Teacher: Sit at every other desk. Put all your things under your desk. Hannah and Gabriela, you are sitting too close together. One of you move!
Message Hannah and Gabriela receive: I expect you two to cheat on this test.

***

A new student comes to Ms. Lincoln's kindergarten. The child is messy and unwashed. Ms. Lincoln puts her hand lightly on the girl's shoulder and speaks:

Ms. Lincoln: I'm glad you are here.
(Her muscles tense, and she leans away from the child.)
Message student receives: I don't like you. I think you are bad.

A student may respond with hostility if she or he feels insulted by the teacher but may not be able to say exactly where the feeling of being insulted came from. Perhaps it was in the teacher's tone of voice or lack of eye contact. But the teacher senses the student's hostility and feels attacked for no reason. The first principle of communication is that people respond to what they think was said or meant, not necessarily to the speaker's intended message or actual words.

Students in my classes have told me about one instructor who encourages accurate communication by using the **paraphrase rule**. Before any participant, including the teacher, is allowed to respond to any other participant in a class discussion, he or she must summarize what the previous speaker said. If the summary is wrong, indicating the speaker was misunderstood, the speaker must explain again. The respondent then tries again to paraphrase. The process continues until the speaker agrees that the listener has heard the intended message.

Paraphrase rule
Policy whereby listeners must accurately summarize what a speaker has said before being allowed to respond.

Paraphrasing is more than a classroom exercise. It can be the first step in communicating with students. Before teachers can deal appropriately with any student problem, they must know what the real problem is. A student who says, "This book is really dumb! Why did we have to read it?" may really be saying, "The book was too difficult for me. I couldn't read it, and I feel dumb."

Empathetic Listening

Let's keep going with the situation in which the student found the reading assignment "dumb." How might a teacher handle this positively?

Student: This book is really dumb! Why did we have to read it?
Teacher: You're pretty upset. This seemed like a worthless assignment to you. [Teacher paraphrases the student's statement, trying to hear the emotions as well as the words.]

Student: Yeah! Well, I guess it was worthless. I mean, I don't know if it was. I couldn't exactly read it.

Teacher: It was a struggle to read, and that bothers you.

Student: Sure, I felt really dumb. I know I can write a good report, but not with a book this tough.

Teacher: I think I can give you some hints that will make the book easier to understand. Can you see me after school today?

Student: OK.

Connect and Extend to PRAXIS II®
Teacher–Student Communication (III, A)
A well-managed classroom requires a bidirectional line of communication between the teacher and students. Describe the various communication styles that teachers employ when interacting with students, and explain how those styles affect student behavior.

Here the teacher used **empathetic listening** to allow the student to find a solution. (As you can see, this approach relies heavily on paraphrasing.) By trying to hear the student and by avoiding the tendency to jump in too quickly with advice, solutions, criticisms, reprimands, or interrogations, the teacher keeps the communication lines open. Here are a few *unhelpful* responses the teacher might have made:

Empathetic listening
Hearing the intent and emotions behind what another says and reflecting them back by paraphrasing.

- I chose the book because it is the best example of the author's style in our library. (The teacher justifies the choice; this prevents the student from admitting that this "important" assignment is too difficult.)

- Did you really read it? I bet you didn't do the work. (The teacher accuses; the student hears, "The teacher doesn't trust me!" and must either defend herself or himself or accept the teacher's view.)
- Your job is to read the book, not ask me why. I know what's best. (The teacher pulls rank, and the student hears, "You can't possibly decide what is good for you!" The student can rebel or passively accept the teacher's judgment.)

Empathetic, active listening is more than a parroting of the student's words; it should capture the emotions, intent, and meaning for the student behind the words. When you are just getting started, try this simple formula for active listening: "You feel… because…" (Nemec et al., 2017). This may seem awkward at first, but when students realize they really have been heard and not evaluated negatively for what they have said or felt, they begin to trust the teacher and to talk more openly. Sometimes the true problem surfaces later in the conversation. Empathetic, active listening has proved useful beyond teaching in counseling, business management, parenting, friendships, and many other situations where trusting relationships are important (Jonsdottir & Fridriksdottir, 2020).

When Listening Is Not Enough: I-Messages, Assertive Discipline, and Problem Solving

Let's assume a student is doing something that actively interferes with teaching. The teacher decides the student must stop. Confrontation, not listening, is required.

I-message
Clear, nonaccusatory statement of how something is affecting you.

I-MESSAGES. Jones and Jones (2016) describe an approach first developed by Thomas Gordon—sending an **I-message** to intervene and change a student's behavior. Basically, this means telling a student in a straightforward, assertive, and nonjudgmental way what she or he is doing, how it affects you as a teacher, and how you feel about it. The student is then free to change voluntarily and often does so. Here are two I-messages:

If you leave your book bags in the aisles, I might trip and hurt myself.

When you all call out, I can't concentrate on each answer, and I'm frustrated.

Learning to use I-messages can help your students handle conflict more productively, too. For example, Esme Codell, an excellent first-year teacher, taught her fifth-graders a simple four-step process and posted the steps on a bulletin board: "1. Tell person what you didn't like. 2. Tell person how it made you feel. 3. Tell person what you want in the future. 4. Person responds with what they can do. Congratulations! You are a Confident Conflict Conqueror!" (Codell, 2001, p. 23).

Assertive discipline
Clear, firm, nonhostile response style.

ASSERTIVE DISCIPLINE. Lee and Marlene Canter (1992; Canter, 1996) suggest other approaches called **assertive discipline** when student behaviors have to be changed. Many teachers are ineffective with students because they are either wishy-washy and passive or hostile and aggressive (Charles & Cole, 2019).

Instead of telling the student directly what to do, teachers use a *passive response style*—they ask the student to *try* or to *think about* the appropriate action. The passive teacher might comment on the problem behavior without actually telling the child what to do differently: "Why are you doing that? Don't you know the rules?" or "Sam, are you disturbing the class?" Or teachers may give the students "one more chance" every time. Finally, teachers may ignore behavior that should receive a response, or they may wait too long before responding.

A *hostile response style* involves different mistakes. Teachers may make "you" statements that condemn the student without stating clearly what the student should be doing: "You should be ashamed of the way you're behaving!" or "You never listen!" or "You are acting like a baby!" Teachers may also threaten students angrily but follow through too seldom, perhaps because the threats are too vague—"You'll be very sorry you did that when I get

through with you!"—or too severe. For example, a teacher tells a student in a physical education class that he will have to "sit on the bench for 3 weeks." A few days later, the team is short one member, and the teacher lets the student play, never returning him to the bench to complete the 3-week sentence. Often a teacher who has been passive becomes hostile and explodes when students persist in misbehaving.

In contrast with both the passive and hostile styles, an *assertive response* communicates to the students that you care too much about them and the process of learning to allow inappropriate behavior to persist. Assertive teachers clearly state what they expect. To be most effective, the teachers often look into a student's eyes when speaking and address the student by name. Assertive teachers' voices are calm, firm, and confident. They are not sidetracked by accusations such as "You just don't understand!" or "You don't like me!" Assertive teachers do not get into a debate about the fairness of the rules. They expect changes, not promises or apologies. More recent versions of assertive discipline focus on teaching students how to behave responsibly and working to establish mutual respect and trust (Charles & Cole, 2019).

CONFRONTATIONS AND NEGOTIATIONS. If I-messages or assertive responses fail and a student persists in misbehaving, teacher and student are in a conflict. Several pitfalls now loom. The two individuals become less able to perceive each other's behavior accurately. Research has shown that the angrier you are with another person, the more you see the other as the villain and yourself as an innocent victim. Because you feel the other person is in the wrong and he or she feels just as strongly that the conflict is all your fault, very little mutual trust is possible. A cooperative solution to the problem is almost impossible. In fact, by the time the discussion has gone on a few minutes, the original problem can be lost in a sea of charges, countercharges, and self-defense.

There are three methods of resolving a conflict between a teacher and a student. One is for the teacher to impose a solution. This may be necessary during an emergency, as when a defiant student refuses to go to the hall to discuss a public outburst, but it is not a good solution for most conflicts. The second method is for the teacher to give in to the student's demands. You might be convinced by a particularly compelling student argument, but again, this should be used sparingly. Problems arise when either the teacher or the student gives in completely.

There is a third possibility called problem solving that allows both teacher and student to have input into a solution. Many versions of problem-solving strategies can work. Jones and Jones (2016) suggest one that is grounded in positive relationships between the teacher and the students and also encourages student responsibility and accountability. Figure 13.5 on the next page shows the basic steps. Many of the conflicts in classrooms can be important learning experiences for all concerned.

Diversity: Culturally Responsive Management

In response to concerns about increased violence in urban schools and the ongoing crisis of school shootings everywhere, many districts adopted harsh punishments and zero-tolerance policies—immediate suspension or expulsion for even minor misconduct. We discussed the problems with zero tolerance earlier in this cluster. One major concern is that these harsh codes are enforced in ways that reinforce racial inequality. Schools with higher concentrations of Black and poor students tend to have harsher discipline policies than schools with more White, Asian, or middle- and upper-income students. Black and Latino/a Americans, especially boys, are punished more often and more harshly than other students. Black students are two to three times more likely to get an office referral or be suspended compared with White students, and Pacific Islander students are more likely to be disciplined than other Asian American or White students. These students lose time from learning as they

Figure 13.5 A Problem-Solving Model

Here is a general set of steps to guide problem solving about student behaviors.

Step 1: Establish a warm, personal relationship with the student.
(Develop a "positive relationship bank account" with the student.)

Step 2: Deal with the present behavior.
"What happened?"
(Develop a time line/functional assessment.)
"What did you do?"
(Help students take responsibility for their role in the problem. Help them develop an internal locus of control.)

Step 3: Make a value judgment.
"Is it helping you?"
(Help students consider their own behavior and underlying assumptions.)
"Is it helping others?"
(Enhance student's social cognition.)
"Is it against a rule/does it violate a compelling state interest?"
(Help students understand their own and others' rights and responsibilities within the community.)

Step 4: Work out a plan.
"What can you do differently?"
(Social skills training)
"What do you need me to do?"
(Empowerment/functional assessment)
"What do you need other students to do?"
(Empowerment/functional assessment)

Step 5: Make a commitment.
"Are you going to do this?"
(Enhance student's accountability/responsibility.)

Step 6: Follow up.
"I'll check later and see how the plan has worked."
(Supportive/caring environment)

Step 7: No put-downs, but do not accept excuses.
"If the plan didn't work, let's analyze why and develop a new plan."
(High expectations and persistence in working with students)

Source: Jones, Vern; Jones, Louise, *Comprehensive classroom management: Creating communities of support and solving problems*, Update, Loose-Leaf Version, 11th ed., p. 324. ©2017. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc.

spend more hours in detention or suspension (Fronius et al., 2016; Gregory et al., 2017; Ispa-Landa, 2018; Larson et al., 2019; Nguyen et al., 2019). Why?

The notion that Black and Latino/a students are punished more because they commit more serious offenses is *not* supported by the data (Huang, 2020). Instead, these students are punished more severely for minor offenses such as rudeness or defiance—words and actions that are interpreted by teachers as meriting severe punishment. One explanation is a lack of cultural synchronization between teachers and students and possible implicit

(unconscious) biases of teachers and administrators (Rudd, 2014). Black students may be disciplined for behaviors that were never intended to be disruptive or disrespectful. Unfortunately, when administrators learn about racial discrepancies in their schools, they seldom make changes in disciplinary actions (McIntosh et al., 2020).

Culturally responsive classroom management has five dimensions: (a) understanding and addressing your own beliefs, biases, values, and stereotypes that are grounded in your own ethnic culture; (b) developing a knowledge of your students' cultural backgrounds; (c) understanding the broader social, economic, and political context of classroom teaching—schools often reflect and reinforce the discriminatory practices of the larger society; (d) an ability and willingness to use culturally appropriate management strategies; and (e) a commitment to building caring classrooms (Sikba et al., 2016; Weinstein et al., 2004).

Culturally responsive classroom management
Taking cultural meanings and styles into account when developing management plans and responding to students.

High-quality teacher–student relationships are central to culturally responsive classroom management. Positive behavioral supports (PBS—see Demetrick Tensley's Casebook response on page 000) that emphasize reinforcement for positive behaviors have been successful, too, which makes sense because PBS focuses on positive, not negative, behavior and should encourage good teacher–student relationships (Long et al., 2019). Teachers of color are more likely to use culturally responsive strategies, so if you are not a member of this group, you may have to work at learning and applying these strategies. Specifically, you can work on developing ways of incorporating students' perspectives into your teaching and management (Gaias et al., 2019). Culturally responsive classroom management is simply a part of the larger concept of culturally relevant teaching. Geneva Gay (2006) sums it up:

> If the classroom is a comfortable, caring, embracing, affirming, engaging, and facilitative place for students then discipline is not likely to be much of an issue. It follows then that both classroom management and school achievement can be improved for students from different ethnic, racial, social, and linguistic backgrounds by ensuring that curriculum and instruction are culturally relevant and personally meaningful for them.

I once asked a gifted educator in an urban New Jersey high school which teachers are most effective with the really tough students. He said there are two kinds: teachers who can't be intimidated or fooled and expect their students to learn and teachers who really care about the students. When I asked, "Which kind are you?" he answered, "Both!" He is an example of a "warm demander," a teacher who seems to be most effective with students placed at risk (Irvine & Armento, 2001; Irvine & Fraser, 1998). **Warm demanders** "expect a great deal of their students, convince them of their own brilliance, and help them to reach their potential in a disciplined and structured environment" (Delpit, 2012, p. 77). They are "strong yet compassionate, authoritative yet loving, firm yet respectful" (Weinstein et al., 2004, p. 34). Sometimes these warm demanders appear harsh to outside observers. Carla Monroe and Jennifer Obidah (2002) studied Ms. Simpson, a Black teacher working with her eighth-grade science class. She describes herself as having high expectations for academics and behavior in her classes—so much so that she believed her students perceived her as "mean." Yet she often used humor and dialect to communicate her expectations, as in the following exchange:

Warm demanders
Teachers who are especially effective with Black students; they show both high expectations and great caring for their students.

> *Ms. Simpson [addressing the class]:* If you know you're going to act the fool just come to me and say, "I'm going to act the fool at the pep rally," so I can go ahead and send you to wherever you need to go. [Class laughs.]
>
> *Ms. Simpson:* I'm real serious. If you know you're having a bad day, you don't want anybody touching you, you don't want nobody saying nothing to you, somebody bump into you you're going to snap—you need to come up to me and say, "I'm going to snap and I can't go to the pep rally." [The students start to call out various comments.]

Ms. Simpson: Now, I just want to say I expect you to have the best behavior because you're the most mature students in the building… don't make me stop the pep rally and ask the eighth graders to leave.

Edward: We'll have silent lunch won't we? [Class laughs.]

Ms. Simpson: You don't want to dream about what you're going to have. [Class laughs.] OK, 15 minutes for warm-ups. [The students begin their warm-up assignment.]

As we have seen throughout this book, families are important partners in education. This statement applies to classroom management as well. But researchers have seldom asked what Black and Latino/a parents want for their children by way of management. One study did examine this question and found that the parents saw school discipline as more than rules and punishments. For these parents, discipline was not an end in itself, but instead a way to ensure safety, order, self-discipline, self-advocacy, and academic rigor (Golann et al., 2019). When parents and teachers share the same expectations and support each other, they can create a more positive classroom environment and more time for learning. The *Guidelines: Family and Community Partnerships—Classroom Organization and* provide ideas for working with families and the community. You can find more ideas through the Harvard Family Research Project (http://hfrp.org).

We have looked at quite a few perspectives on classroom management. Clearly, there is no one-size-fits-all strategy for creating supportive social and physical spaces for learning. The American Psychological Association has a wealth of research-based resources for teachers on classroom management. See http://www.apa.org and search for "classroom management" to find videos, modules, and other possibilities. Also visit http://www.edutopia.org and search for "classroom management."

GUIDELINES

Family and Community Partnerships

Classroom Organization and Management

Make sure families know the expectations and rules of your class and school.

Examples

1. At a Family Fun Night, have your students do skits showing the rules—how to follow them and what breaking them "looks like" and "sounds like."
2. Make a poster for the refrigerator at home that describes, in a light way, the most important rules and expectations.
3. For older students, give families a list of due dates for the major assignments, along with tips about how to encourage quality work by pacing the effort—preventing last-minute panic. Some schools require family members to sign a paper indicating they are aware of the due dates.
4. Communicate in appropriate ways—use the family's first language when possible. Tailor messages to the reading level of the home.

Make families partners in recognizing good citizenship.

Examples

1. Send positive notes home when students, especially students who have had trouble with classroom management, work well in the classroom.
2. Give ideas for ways any family, even those with few economic resources, can celebrate accomplishment—a favorite food; the chance to choose a game to play; a comment to a special person such as an aunt, grandparent, or minister; the chance to read to a younger sibling.

Identify talents in the community to help build a learning environment in your class.

Examples

1. Have students write letters to carpet and furniture stores asking for donations of remnants to carpet a reading corner.
2. Find family members who can build shelves or room dividers, paint, sew, laminate manipulatives, write stories, repot plants, or network computers.
3. Contact businesses for donations of computers, printers, or other equipment.

Seek cooperation from families when behavior problems arise.

Examples

1. Talk to families over the phone or in their home. Keep good records about the problem behavior.
2. Listen to family members, and solve problems with them.

Module 42 Summary

Dealing with Discipline Problems (pp. 582–594)

Describe eight levels of intervention in misbehavior. Teachers can first make eye contact with the student or use other nonverbal signals and then try verbal hints such as simply inserting the student's name into the lecture. Next, the teacher asks if the offender is aware of the negative effects of the actions and then reminds the student of the procedure and has her or him follow it correctly. Especially if a few students are "drifting away," you can involve the whole class in a brief interactive activity such as Think-Pair-Share. If this does not work, the teacher can ask the student to state the correct rule or procedure and then follow it and then tell the student in a clear, assertive, and nonhostile way to stop the misbehavior. If this fails, too, the teacher can offer a choice—stop the behavior or meet privately to work out the consequences. If you must impose penalties, consider the seven categories used carefully by experienced teachers: express disappointment, remove privileges, time-out, reflecting on the problem, visit to the principal, detention, and contacting parents. All penalties must be applied with care and, ultimately, with kindness.

What are some alternatives to harsh penalties and zero-tolerance policies? Beware of inflexible zero-tolerance policies. They often increase racial injustice. Restorative justice programs are a good alternative, especially if these programs involve the entire school and community. Restorative justice focuses on building, nurturing, and repairing relationships while giving a voice to victims, offenders, and the community. The goal is to reduce reliance on traditional punishments and police involvement but still hold misbehaving students accountable. Another alternative to teacher-imposed penalties is Marshall's Discipline Without Stress Teaching Model, which emphasizes student responsibility and autonomy.

What can teachers do about bullying, teasing, and cyberbullying? Prolonged bullying has negative effects on the academic achievement, social relationships, and mental health of the victims and the victimizers. Teachers often underestimate the amount of peer conflict and bullying, including cyberbullying, that happens in schools. Bullying involves both an imbalance of power among students and repeated attempts at harm and may take place in a variety of settings—including those in which students are not face-to-face with one another at school. Teachers can think of bullying as a form of violence and approach strategies for overcoming bullying as they would strategies to overcome other violent acts. For example, prevention of bullying can take the form of developing a respectful classroom community and discussing conflict. Also, ask what the bullies are getting out of their behavior and how they can achieve those goals in more positive ways.

What are some challenges in secondary classrooms? Teachers working in secondary schools should be prepared to handle students who don't complete schoolwork, repeatedly break the same rule, or openly defy teachers. These students may also be experiencing new and powerful stressors. As a result, secondary students may benefit if teachers provide opportunities or point out resources for these students to seek out help and support. Teachers might also find consultation with guidance counselors and parents or caregivers helpful.

The Need for Communication (pp. 594–597)

What is meant by "empathetic listening"? Communication between teacher and student is essential when problems arise. All interactions between people, even silence or neglect, communicate some meaning. Empathetic, active listening can be a helpful response when students bring problems to teachers. Teachers must reflect back to the students what they hear them saying. This reflection is more than a parroting of words; it should capture the emotions, intent, and meaning behind them.

Distinguish among passive, hostile, and assertive response styles. The passive response style can take several forms. Instead of telling the student directly what to do, the teacher simply comments on the behavior, asks the student to think about the appropriate action, or threatens but never follows through. In a hostile response style, teachers may make "you" statements that condemn the student without stating clearly what the student should be doing. An assertive response communicates to the students that the teacher cares too much about them and the process of learning to allow inappropriate behavior to persist. Assertive teachers clearly state what they expect. If communication attempts fail, teachers and students can try problem-solving strategies and encourage student responsibility and accountability.

Diversity: Culturally Responsive Management (pp. 597–601)

What is culturally responsive management, and why is it needed? Black and Latino/a Americans, especially boys, are punished more often and more harshly than other students, but they do not commit more serious offenses. Instead, these students are punished more severely for minor offenses such as rudeness or defiance—words and actions that are interpreted by teachers as meriting severe punishment. One explanation is a lack of cultural synchronization between teachers and students. High-quality teacher–student relationships are central to culturally responsive management. Positive behavioral supports (PBS; Cluster 7) that emphasize reinforcement for positive behaviors have been successful, too. Lisa Delpit suggests that warm demanders, who expect a great deal of their students, convince them of their own brilliance, and help them to reach their potential in a disciplined and structured environment, are helpful for students of color.

Cluster 13 Review

Key Terms

Academic learning time
Assertive discipline
Classroom management
Culturally responsive classroom management
Empathetic listening
EMR model
Engaged time
Group focus
I-message
Movement management
Natural/logical consequences
Overlapping
Paraphrase rule
Participation structures
Procedures/routines
Restorative justice
Rules
Self-management
Time on task
Warm demanders
Withitness

Connect and Extend to Licensure

Multiple-Choice Questions

1. What is the aim of classroom management?
   - **A.** To keep an orderly classroom
   - **B.** To establish the primacy of the teacher
   - **C.** To sustain a quiet and disciplined environment
   - **D.** To maintain a positive, productive learning environment
2. Which of the following is NOT a benefit of teaching students to be self-regulated?
   - **A.** Students demonstrate the ability to fulfill their own needs without interfering with the rights and needs of others.
   - **B.** Teachers have fewer management problems, less stress, and more time to teach.
   - **C.** Students require increased teacher attention; therefore, they learn more.
   - **D.** Although it requires extra time initially, it leads to greater teacher self-efficacy.
3. Mr. Ruiz was constantly plagued by students disrupting his English class. Determined to finally gain control, he resorted to after-school detention, dropping letter grades, and belittling his students. When his evaluation by the principal occurred at the end of the term, he received low scores on his classroom management skills. His principal, Dr. Simon, provided feedback based on research. Which one of the following would NOT be consistent with ideal ways to deal with Mr. Ruiz's problems?
   - **A.** Teachers should begin the school year with severe consequences so students understand that the teacher controls the classroom.
   - **B.** Teachers should aim to prevent classroom problems before they occur.
   - **C.** Teachers should exhibit withitness and overlapping in their activities.
   - **D.** Teachers must understand and practice movement management.
4. Which of the following techniques is recommended for approaching and disciplining a student who may be prone to explosive behavior?
   - **A.** Move swiftly and get as close to the misbehaving student as possible.
   - **B.** Ensure that there are several witnesses to the confrontation.
   - **C.** Be respectful and brief.
   - **D.** Use a loud voice to establish power.

Constructed-Response Questions

Case

It happened every day. Ginny Harding had to reprimand two boys in her class continually. Instead of feeling like a coach and mentor, Ginny started to feel like a nag. It wore on both boys and also on her. The boys were not malicious, they were just third-graders being third-graders. She remembered hearing an adage that one should not continue to do the same thing and expect different results. Over the next weekend, Ginny decided to develop a more effective manner of handling this latest challenge.

5. List several simple ways in which Ginny Harding can quickly stop the boys from misbehaving.
6. Routines and procedures can also reduce the incidence of misbehavior by assisting students in smooth transitions from one activity to another. List several classroom operations and activities that should have an established routine or procedure.

What Would They Do?

Teachers' Casebook: Bullies and Victims

At the beginning of this cluster, we asked you to think critically about how to respond to problems with bullies at school. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Christen Dillon • K–12th-Grade Music Teacher
Model Laboratory School at Eastern Kentucky University, Richmond, KY

Classroom teachers typically have colleagues who are better equipped to handle this situation from a professional standpoint. Thankfully, we as teachers are able to rely on professional learning communities for support and help with students. After informing my administration, the next step in this process would be to let my student know I am eager to support and I care, without addressing the situation directly; sexuality and gender are so personal this could cause undue stress if your relationship with the student isn't established.

A comment as simple as "I've noticed your work has been declining" is enough to show your student you know something is wrong and that you are interested in helping, but does not acknowledge the situation and allows the student to make the choice to share with you if desired.

Restorative justice is a practice I use in my classrooms to promote healthy student-to-student and student-to-teacher interactions. It is my job to *explicitly* teach students interpersonal skills needed to interact with people who look and act "differently." Using the principles of restorative justice in this scenario would allow the bullies, bullied student, teacher, parents, and administration to come to an agreement that allows the bullies to make restitution to their victim in a way that is meaningful, rather than just punishing the bullies and moving on. This restitution could take the form of the bullies completing community service hours at their local pride center or helping to create a program at the school that teaches others about differences between gender and sexuality. It's important to remember that representation matters—students need to see people like them in their lessons and in their schools. It is our job as teachers to make sure that all students feel accepted, regardless of our own feelings about matters such as religion and sexuality.

Demetrick Tensley • 6th–8th-Grade Business Education and Computer Science Teacher
Seneca Middle School, Seneca, SC

The described scenario is intense and multifaceted. As a high school teacher, I would approach it layer by layer. This situation requires a team approach. To initiate this team effort, I would cogently communicate all relevant information in writing to administration, guidance, and the school resource officer. I would also request a meeting to discuss the situation. Some schools have seen factors like gender, athletic ability, or personal connections skew disciplinary processes. By having all appropriate individuals in the loop from the onset, these pressures may be reduced and decision making more in line with policy and procedure.

Intimidation and bullying could intensify as the "popular" and "successful" athletes are investigated. I would therefore implore the team to act summarily to notify the family of the student and provide appropriate arrangements for this student's instruction. Swift action would be needed as retaliatory acts toward this student would likely be detrimental to their wellbeing.

These incidents are alleged to have happened on and off school property and involve extortion of money, assault, gender discrimination, and xenophobia. To pursue these claims, a comprehensive investigation must be initiated. Witness statements and surveillance footage will be key. After review of the body of evidence, discipline in line with the district's code of conduct and possibly legal action can be levied.

I would follow up with a guided discussion on bullying in my classroom. This would be an additional measure that alone would not be sufficient. These incidents do not occur in isolation. I would press the team to conduct a schoolwide SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to determine factors that led to this extensive bullying. From there, a Positive Behavioral Interventions and Supports (PBIS) program could be implemented to cultivate a more inclusive learning environment.

Mari Ann Banks, PH.D. • Chief Diversity Officer
City Schools of Decatur, Decatur, GA

I am the Chief Diversity Officer in an urban school district. If consulted about this situation, although several issues must be addressed, I would encourage the teacher to begin with reaching out to the bullied student immediately. The absenteeism and declining grades are of serious concern and they could possibly be indicating thoughts of self-harm. The student needs to know that someone sees him and cares about what he is experiencing. This can also be a time where the teacher can collect more data on the bullying incidents from this student's perspective. Simultaneously, I would suggest increasing supervision in high-risk areas such as the hallways, locker rooms, and lunchroom to prevent a repeat of the bullying behavior. Given my position, however, I would like to specifically speak to the gender- and race-related aspects of the bullying. There's a strong correlation between bias and bullying. Targets of children who bully are often from groups who are marginalized because of various cultural characteristics about which others hold prejudiced assumptions (such as race, immigration status, sexual orientation, etc.). For example, GLSEN's National School Climate Survey indicates that verbal and physical harassment as well as physical assault have only increased for students who identify as GLBTQ since 2015. Race-based harassment and violence in U.S. schools has increased as well. Therefore, there is little surprise that students have chosen to target someone they perceive as atypical. Because this behavior is so prevalent, teachers cannot solve it on an individual level. It must be addressed systemically. Schools must create a learning environment that is inhospitable to those who would bully.

Miriam Miller • Teacher Educator and Intermediate Teacher for English Language Learners
University of British Columbia, Vancouver BC, CanadaPreparing Academic Leaders Academy, Maple Heights, OH

First, I want to acknowledge how complex this situation is; there are many layers in this bullying situation, including the power imbalance related to physical development, social capital, race and gender identity, and even crime.

We know that bullying is a relational problem, so my immediate response is to wonder what could have happened to prevent the situation before it escalated. As an educator, I want to create positive peer relationships and a classroom climate where prosocial, upstander behavior is the norm and bullying is unacceptable. To promote positive relationships and

prevent bullying, I would use restorative practices, social and emotional learning (SEL), and instructional design (e.g., cooperative learning/positive interdependence) in my classroom.

In this case, where the situation has escalated beyond prevention, intervention is required. Regardless of gender identity, I would immediately involve the school principal and counselor. I would want the student who has been bullied to feel the adults at school care about his safety and are actively doing what they can to ensure he is protected. I would encourage the student to continue to report any instance of bullying. If the family is willing, I would include the family in these conversations. With support from the counselor, I would work with the student to build social skills (e.g., learning to be assertive through role-playing) and positive self-concept and mental health (e.g., encouraging the student to find things they are good at doing). Separately, the principal and counselor would address the students who were bullying (their families would also be involved).

To address the hateful comments, I would hold a community circle to discuss homophobia and racism. I would encourage my students to problem-solve what to do if they heard homophobic/racist comments. I would invite my students to refer to our co-created classroom agreements outlining our norms for behavior and reflect on what we can do to promote inclusion and care. I would do this regardless of which students were in my class.

For the students who were bullying, I would work with the principal to create a formative (restorative) discipline plan, so that the consequences are opportunities to teach and learn, rather than punitive discipline that might only perpetuate the problem.

Jolita Harper • 3rd-Grade Teacher

Preparing Academic Leaders Academy, Maple Heights, OH

I believe that the entire learning community has a clear role in preventing acts of intimidation between students, and that this is best accomplished with clear communication between all parties. Care should be taken to spread awareness between colleagues as to the nature of the situation. Classroom teachers who are alert to these instances of bullying are then able to provide an additional presence in situations, such as in hallways and the lunchroom, where this is likely to take place. Further, communication between individual classroom teachers and the victim of this bullying is essential. I would make certain to provide a sensitive ear to this student's plight as we work together to formulate alternatives toward improving the situation. Finally, in the event that the two bullying students were in my classes, I would communicate with them in such a way as to make clear the effect of their actions on others in an effort to promote empathy for their victim and, hopefully, initiate a change in their behaviors.

Keith J. Boyle • 9th–12th-Grade English Teacher

Dunellen High School, Dunellen, NJ

Errant behavior throughout the middle school may be indicative of future behavioral problems and, as many things in life, the more this misbehavior is allowed to exist, the longer it will have a chance to thrive. In this case of a child being continually bullied by two other children (gender having no bearing in this situation), the knowledge of this wrongdoing must not be ignored or isolated. I would interview both the victim and the bullies, separately, to glean as much information as possible. If this were a singular incident, I would attempt to handle it myself via contact with the pertinent parents. However, if this were a recurring problem, the administration must be made aware. Any administrator will acknowledge that to be left in the dark about a serious situation within the environs of his or her responsibility is precarious. The appropriate guidance counselor should also be involved. The gravity of abusive behavior toward fellow students must be emphasized to the offenders. Significant punitive action is integral to send a message to the entire community that their school is indeed a haven in which one can feel the uninhibited freedom to learn.

Kelley Crockett • Professor and Former Elementary School Teacher

San Diego State University, San Diego, CA, and Fort Worth, TX

Bullying cannot be tolerated. No school, no teacher, no administrator can afford a climate in which abusive behavior is allowed to germinate. Any incident of victimization must be immediately documented and submitted to the principal. As well, I would schedule a conference that same day with the school counselor for my student to both allow another avenue of documentation and reinforce support that the problem is being aggressively addressed.

How I handle the next step depends on the administration in place, but the important issue to remember is that there is a next step. The teacher must follow up with the student. Within 48 hours I would privately ask my student if there have been any further incidents. If he hesitates or acknowledges continued harassment I would direct him to write it down, and I would document any questions I had asked him and his responses. I would then include his statement and my own in another report for both the principal and the counselor.

As teachers, we hold the front line. To the children in our care, we represent one of the first relationships with authority and civilized society. We can do no less than lend our voice and action to the betterment of our world.

Cluster 14

Teaching Every Student



Savannah, Age 4

Teachers' Casebook:

Reaching and Teaching Every Student

What Would You Do?

You have started a new job in a high school in your hometown. The community is very diverse. In the classes you will be teaching, you are likely to find a wide range of reading levels, family incomes, learning strengths, and learning challenges. You know that two of your students are practically ready for college, while several struggle to read and write at grade level. Also, you know that reading English academic texts will be a challenge for some of your students, even though they converse in English with little trouble.

Critical Thinking

- How would you differentiate instruction to meet the diverse needs of students?
- Do different philosophies of teaching provide different answers to this question?
- How will you assess learning if you have successfully differentiated instruction?
- How could you incorporate technology into your teaching to reach all your students?

Overview and Objectives

Much of this text has been about learning and learners. In fact, we have spent 13 clusters discussing development, individual and cultural differences, learning, and motivation. Why? The ultimate goal is so you can become a great teacher. Are there particular characteristics that distinguish effective teachers from ineffective ones? Research on whole-class teaching points to the importance of several factors that we will explore, including how teachers' beliefs about their students' abilities—teacher expectations—might influence student learning and teacher–student relationships.

What else do we know about teaching? Some researchers call for ambitious instruction that creates challenging but also engaging classes filled with complex tasks and high-quality discussions where students base their statements on evidence. We will look at this conception of teaching. Teachers also are designers—they create learning environments (Warr & Mishra, 2021). In the process, they set goals for their students, develop teaching strategies and activities, and assess to see if goals have been met. We look at how teachers plan, including how to use state standards, taxonomies of learning objectives, themes, and essential questions as a basis for planning. With this foundation of knowing how to set goals and make plans, as well as an understanding of the characteristics of effective teachers, we move to a consideration of some general teacher-centered strategies: direct instruction, independent work, homework, questioning, recitation, group discussion, and Quality Talk. We then pull goals and strategies together by exploring the Understanding by Design model.

In the final section of this cluster, we will focus on how to match teaching to the needs and abilities of students through differentiated instruction, flexible grouping, and universal design for learning.

By the time you have completed this cluster, you should be able to:

14.1 Identify the methods used to study teaching as well as the characteristics of effective teachers and effective classroom climates, including the role of teacher expectations and the goal of ambitious teaching.

14.2 Describe the planning process, including the possibilities of Lesson Study, and how to develop Learning Objectives that are consistent with the standards in your state using either Bloom's taxonomy or Webb's Depth of Knowledge levels.

14.3 Discuss the appropriate uses of direct instruction, independent work, homework, questioning (particularly authentic questions), feedback, dialogue, and group discussion and explain how to use Understanding by Design to integrate outcomes, evidence for reaching those outcomes, and teaching strategies.

14.4 Define differentiated instruction and apply this approach to teaching a diverse group of students, including how to apply the guidelines of universal design for learning in your teaching.

OUTLINE

Teachers' Casebook—Reaching and Teaching Every Student
What Would You Do?
Overview and Objectives

MODULE 43: Planning for Effective Teaching
Research on Teaching
- Characteristics of Effective Teachers
- Knowledge for Teaching
- Teacher Expectations
- The Goal: Ambitious Teaching

The First Step: Planning
- Research on Planning
- Learning Goals
- Flexible and Creative Plans—Using Taxonomies
- The Cognitive Demands of Learning Objectives: Webb's Depth of Knowledge
- Planning from a Constructivist Perspective

MODULE 44: Teaching Every Student
Teaching Approaches
- Research on Teaching Strategies
- Explicit Teaching and Direct Instruction
- Independent Work and Homework
- Questioning, Discussion, Dialogue, and Feedback
- Lessons for Teachers: Fitting Teaching to Your Goals
- Putting It All Together: Understanding by Design

Differentiated Instruction
- Within-Class and Flexible Grouping
- Differentiated Instruction in Inclusive Classrooms
- Reaching Every Student: Differentiation with Universal Design for Learning

Cluster 14 Review
Key Terms • Connect and Extend to Licensure • Teachers' Casebook—Reaching and Teaching Every Student: What Would They Do?

MODULE 43 Planning for Effective Teaching

Learning Objective 14.1 Identify the methods used to study teaching as well as the characteristics of effective teachers and effective classroom climates, including the role of teacher expectations and the goal of ambitious teaching.

Learning Objective 14.2 Describe the planning process, including the possibilities of Lesson Study, and how to develop Learning Objectives that are consistent with the standards in your state using either Bloom's taxonomy or Webb's Depth of Knowledge levels.

Research on Teaching

How would you identify the keys to successful teaching? You might ask experienced teachers, students, principals, or college professors of education to list the characteristics of good teachers. Or you could do intensive case studies of a few classrooms over a long period. You might observe classes, rate different teachers on certain characteristics, and then see which characteristics were associated with teachers whose students either achieved the most or were the most motivated to learn. (To do this, of course, you would

have to decide how to assess achievement and motivation.) You could identify teachers whose students, year after year, learned more than students working with other teachers; then you could observe the more successful teachers and note what they do. You might also train teachers to apply several different strategies to teach the same lesson and then determine which strategy led to the greatest student learning. You could video teachers and then ask them to view the videos and report what they were thinking about as they taught and what influenced their decisions while teaching; this process is called *stimulated recall*. You might study transcripts of classroom dialogue to learn what helped students understand the material. You might use the relationships identified between teaching and learning as the basis for developing teaching approaches and then test these approaches in *design experiments*, or by collaborating with teachers in participatory research to improve their practice.

Since the 1970s, all of these approaches and more have been used to investigate teaching (see Floden, 2001; Good, 2014; Gröschner et al., 2013 for summaries of almost 50 years of research). Let's examine some of the specific knowledge gained from these projects, keeping in mind that much of the research was conducted in K–8 classrooms, often during mathematics lessons, and that student performance on standardized tests was generally used as the indicator of good teaching.

Characteristics of Effective Teachers

Stop & Think Think about the most effective teacher you ever had—the one who sparked your interest and expanded your knowledge. What were the characteristics of that person? What made that teacher so effective?

Some of the earliest research on effective teaching identified three teacher characteristics related to learning: clarity, warmth, and knowledge. Recent research has focused on knowledge, so we will spend some extra time on that characteristic.

CLARITY AND ORGANIZATION. When Barak Rosenshine and Norma Furst (1973) reviewed about 50 studies of teaching, they concluded that *clarity* was the most promising teacher behavior for future research on effective teaching. Teachers who provide clear presentations and explanations tend to have students who learn more and who rate their teachers more positively (Comadena et al., 2007; Hines et al., 1985). The clearer and less *vague* the teacher's explanations and instructions were, the more the students learned. Vague explanations were filled with "somes" (*some*how, *some* way, *some* people, *some*time, *some*one, *some*thing…) and "you knows" (Evertson & Emmer, 2017).

ENTHUSIASM AND WARMTH. Research has found that ratings of teachers' enthusiasm are correlated with student achievement gains (Keller et al., 2013, 2016) and are also related to student interest in the subject (Keller et al., 2014). Also, teachers' positive emotions while working (e.g., feeling inspired, alert, attentive, and interested and not nervous, ashamed, or irritable), their job satisfaction, and their self-efficacy are all related to experiencing enthusiasm (Buric & Moè, 2020). It is possible that when teachers are enthusiastic, they capture and hold student attention, and also enthusiastic teachers model engagement and interest in learning. Student attention, interest, and engagement lead to learning. Of course, it is easier to be an enthusiastic teacher when your students are learning (Keller et al., 2013).

Warmth, friendliness, and understanding seem to be the teacher traits most strongly associated with students' liking the teacher and the class in general (Hamann et al., 2000; K. Madsen, 2003). Also, in studies of the emotional climate of the classroom, researchers consistently find that students learn more in classes where teacher–student relationships are warm, caring, nurturing, and congenial; the teacher takes student needs and perspectives into account; and teachers are not harsh or sarcastic. It is likely that the link between the positive emotional climate and student learning is student engagement (Meyer & Anderman, in press; Reyes et al., 2012; Tennant et al., 2014).

What about another important teacher characteristic—knowledge?

Knowledge for Teaching

Expert teachers
Experienced, effective teachers who have developed solutions for classroom problems. Their knowledge of the teaching process and content is extensive and well organized.

As you saw in Clusters 8 and 9, knowledge is the defining characteristic of expertise. **Expert teachers** have elaborate systems of knowledge for understanding problems in teaching. For example, when a beginning teacher is faced with students' wrong answers on math or history tests, all of these answers may seem about the same—wrong. But for an expert teacher, wrong answers are part of a rich system of knowledge that could include:

1. How to recognize several types of wrong answers,
2. The misunderstanding or lack of information behind each kind of mistake,
3. The best way to reteach and correct the misunderstanding,
4. Materials and activities that have worked in the past, and
5. Several ways to test whether the reteaching was successful.

Pedagogical content knowledge (PCK)
Teacher knowledge that combines mastery of *academic content* with knowing *how to teach* the content and how to match instruction to *student differences*.

This unique kind of teacher knowledge that combines mastery of *academic content* with knowing *how to teach* the content and how to match instruction to *student differences* is called **pedagogical content knowledge (PCK)**. This knowledge is very complex and specific to the *situation* (e.g., first-period physics), *topic* (e g., the concept of "force"), *students* (advanced? struggling? learning English as an additional language?), and even the individual *teacher*. These teachers are **reflective** practitioners, constantly trying to understand and improve their work with students (Hogan et al., 2003).

Reflective
Thoughtful and inventive. Reflective teachers think back over situations to analyze what they did and why and to consider how they might improve learning for their students.

Do teachers who know more about their subject have a more positive impact on their students? It depends on the subject. When H. C. Hill, Rowan, and Ball (2005) tested U.S. first- and third-grade teachers' specific knowledge of the math concepts that they actually teach and their understanding of how to teach those concepts, they found that teachers with greater *content* and *pedagogical content knowledge* had students who learned more mathematics. In a study by Lui and Bonner (2016), math conceptual knowledge was more important in lesson planning than beliefs and theories about teaching and learning for both preservice and in-service elementary teachers. Studies in German high schools have found that math teachers with more pedagogical content knowledge have students who are more cognitively engaged and more supported in learning, and this higher-quality instruction predicts higher student math achievement (Baumert et al., 2010).

When we look at teachers' knowledge of facts and concepts in other subjects besides math, as measured by test scores and college grades, the relationship to student learning is unclear and may be indirect. Teachers who know more may make clearer presentations and recognize student difficulties more easily. They are ready for any student questions and do not have to be evasive or vague in their answers. Thus, knowledge helps teachers be *clearer*, more *organized*, and more *responsive* to student questions (Aloe & Becker, 2009).

Pedagogical content knowledge is a foundation for effective teaching, but the real-time thinking and decision making based on that knowledge has been called *pedagogical reasoning* or *instructional reasoning*. This is "the thinking that underpins informed professional practice" (Loughran, 2019, p. 4). The thing about teaching is that there are hundreds of large and small decisions every day—which student to call on next, how long to spend on a topic, whether to answer a question or turn it back on the student, for example. Pedagogical reasoning is the union of thought and action. This reasoning requires diagnosing what specific students need in specific situations and doing that quickly, all the while keeping track of what is happening "behind your back."

There is another line of important research on teacher characteristics—the examination of teacher expectations.

Teacher Expectations

Marvin Marshall (2013) tells the story of a teacher who was delighted when she saw the listing for her new class. "Wow, have I got a bright class this year! Look at these amazing IQs—116, 118, 122, 124.…" The teacher designed a host of challenging activities, set high expectations for her students, and communicated her confidence in them to excel. They did. Only much later did the teacher discover that the numbers beside the students' names were their locker numbers!

Can expectations make a difference? Over 50 years ago, a study by Robert Rosenthal and Lenore Jacobson (1968) captured the attention of the national media in a way that few studies by psychologists have since then. Debate about the meaning of the results continues (De Boer et al., 2010; Jussim, 2013; Jussim et al., 2009; Snow, 1995). What did Rosenthal and Jacobson say that caused such a stir? They randomly chose several students in a number of elementary school classrooms, and then told the teachers that these students probably would make significant intellectual gains during the year. That group of students did indeed make larger gains than normal that year. The researchers presented data suggesting the existence of a **Pygmalion effect** or self-fulfilling prophecy in the classroom. A **self-fulfilling prophecy** is a groundless expectation that leads to behaviors that then make the original expectation come true (Merton, 1948). An example is a false belief that a bank is failing; this leads to a rush of patrons withdrawing money, which then causes the bank to fail as expected. Recent research has demonstrated that teacher expectation effects are real and matter for students (Gentrup et al., 2020; Johnston et al., 2019; Rubie-Davies et al., 2020; Van den Broeck et al., 2020). Let's look deeper.

Pygmalion effect
Exceptional progress by a student as a result of high teacher expectations for that student; named for the mythological king Pygmalion, who made a statue and then caused it to be brought to life.

Self-fulfilling prophecy
A groundless expectation that is confirmed because it has been expected.

Stop & Think When you thought about the most effective teacher you ever had, was one of the characteristics that the teacher believed in you or demanded the best from you? How did the teacher communicate that belief?

TWO KINDS OF EXPECTATION EFFECTS. Two kinds of expectation effects can occur in classrooms. In the self-fulfilling prophecy just described, the teacher's beliefs about the students' abilities have no basis in fact, but student behavior comes to match the initially inaccurate expectation. The second kind of expectation effect occurs when teachers are fairly accurate in their initial reading of students' abilities and respond to students appropriately. The problems arise when students show some improvement but teachers do not alter their expectations to take account of the improvement. This is called a **sustaining expectation effect** because the teacher's unchanging expectation sustains the student's achievement at the expected level. The chance to raise expectations, provide more appropriate teaching, and thus encourage greater student achievement is lost. In practice, self-fulfilling prophecy effects seem to be stronger in the early grades, and sustaining effects are more likely in the later grades (Kuklinski & Weinstein, 2001).

Sustaining expectation effect
Student performance is maintained at a certain level because teachers don't recognize improvements.

SOURCES OF EXPECTATIONS. Research in the United States and around the world documents many possible sources of teachers' expectations, including intelligence test scores (especially if they are not interpreted appropriately), gender, notes from previous teachers, the medical or psychological reports in students' permanent files, prior knowledge about older brothers and sisters, appearance (higher expectations for attractive students), previous achievement, SES, race and ethnicity, immigrant status, language, parents' incarceration, diagnoses of learning challenges, being overweight, and the actual behaviors of the student (Johnston et al., 2019; Sneyers et al., 2020; Van Matre et al., 2000). Even the student's after-school activities can be a source of expectations. Teachers tend to hold higher expectations for students who participate in extracurricular activities than for students who do nothing after school. And recent studies show that some teachers may hold class-level expectations; that is, they have higher or lower expectations for all the students in a particular class (Pitten Cate & Glock, 2018; Rubie-Davies, 2010; Rubie-Davies et al., 2020).

Some students are more likely than others to be the recipients of *sustaining expectations*. For example, withdrawn children provide little information about themselves, so teachers may sustain their expectations about these children simply for lack of new input (Jones & Gerig, 1994). *Self-fulfilling prophecy* effects tend to be stronger for students from lower-SES families and for Black students (De Boer et al., 2010). In a synthesis of over 50 studies, Harriet Tenenbaum and Martin Ruck (2007) found that teachers held higher expectations for and directed more positive questions and encouragement toward European American students compared with Black and Latino/a students. The highest expectations were reserved for Asian American students.

Expectations and beliefs focus attention and organize memory, so teachers may pay attention to and remember the information that fits their initial expectations (Fiske, 1993). Even when student performance does not fit expectations, the teacher may rationalize and attribute the performance to external causes beyond the student's control. For example, a teacher may assume that the low-ability student who did well on a test must have cheated and that the high-ability student who failed must have been upset that day. In both cases, behavior that seems out of character is dismissed. It may take many instances of supposedly uncharacteristic behavior to change the teacher's beliefs about a particular student's abilities. Thus, expectations often remain in the face of contradictory evidence (Brophy, 1998).

DO TEACHERS' EXPECTATIONS REALLY AFFECT STUDENTS' ACHIEVEMENT? The answer to the question "Do teachers' expectations really affect students' achievement?" is more complicated than it might seem. There are two ways to investigate the issue. One is to give teachers unfounded expectations about their students and note if these baseless expectations have any effects. The other approach is to identify the naturally occurring expectations of teachers and study the effects of these expectations. The answer to the question of whether teacher expectations affect student learning depends in part on which approach is taken to study the question.

The original Rosenthal and Jacobson experiment used the first approach—giving teachers groundless expectations and noting the effects. A careful analysis of the results revealed that even though first- through sixth-grade students participated in the study, the self-fulfilling prophecy effects could be traced to dramatic changes in just five students in first and second grades. Unfounded expectations likely have only a small effect on student IQ scores (the outcome measure used by Rosenthal and Jacobson) and only in the early years of a new school setting—in the first years of elementary school and then again in the first years of middle school (Raudenbush, 1984).

But what about the second approach—naturally occurring expectations? Research shows that teachers do indeed form beliefs about students' capabilities. Many of these beliefs are accurate assessments based on the best available data and are corrected as new information is collected (Jussim & Harber, 2005). But inaccuracies can make a difference. For example, a study by Christine Rubie-Davies and her colleagues (2020) followed 31 teachers (grades 2 to 7) for a year. The teachers were chosen because their reading achievement expectations for their whole class were either higher or lower than their students' actual reading levels at the beginning of the year—so the expectations were inaccurate in one direction or the other. By the end of the year, students of the high-expectation teachers had more positive beliefs about themselves and their teachers and also achieved at higher levels compared to the students in the low-expectation teachers' classes. In a longitudinal study by Nicole Sorhagen (2013), teachers' over- and underestimations of students' math and language abilities in first grade predicted the students' math, reading comprehension, vocabulary knowledge, and verbal reasoning standardized test scores at age 15, and the impact was greater for students from lower-income families. Another study in high schools found that students were more likely to complete college when their 10th-grade teachers held higher expectations for them. The teachers in the study had positive biases on average, but less so when a White teacher was describing a Black student (Papageorge et al., 2020). If teachers decide that some students are less able and if the teachers lack effective strategies for working with lower-achieving students, then students may experience a double threat—low expectations and inadequate teaching (Good & Brophy, 2008). Perhaps the underestimation of the abilities of children in poverty is one factor contributing to the opportunity gap for those students. As you become a teacher, you "need to understand the importance of teacher expectations in predicting both academic and socio-psychological outcomes, particularly for disadvantaged students"(Rubie-Davies et al., 2020, p. 1196).

Table 14.1 Teacher Expectations and Instruction

Here are some ways that teachers differentiate their instruction and communications toward students based on the teachers' expectations about student abilities.

EXPECTATIONS	INSTRUCTION	INTERACTIONS AND RELATIONSHIPS
High	-More challenging lessons -More opportunities for choice -More likely to be assigned to high or gifted group	-More opportunities and time to respond to teacher questions -More opportunity for follow-up questions—*tell me more* -More *stay-with behavior*—teacher provides clues or rephrases the questions -More teacher *praise* and *positive feedback about performance* -Greater teacher warmth, smiles, affective support -Greater encouragement to pursue higher education
Low	-Less challenging lessons, more drill and practice -Fewer opportunities for choice -More likely to be assigned to low groups	-Fewer opportunities and less time to respond to teacher questions -Less opportunity for *follow-up questions* -More *give-up behavior*—teacher provides the answer or calls on another student to do so -More teacher *criticism* for wrong answers, less praise for correct answers -Less corrective feedback for wrong answers -Fewer teacher smiles, less personal warmth

The power of the expectation effect depends on the age of the students (generally speaking, younger students are more susceptible) and on how differently a teacher treats high- versus low-expectation students (Kuklinski & Weinstein, 2001). Teachers may use different instructional strategies and also have different interactions and relationships with students based on expectations, as shown in Table 14.1 (Gentrup et al., 2020; Good, 2014).

In terms of instruction, when students who are ready for more challenging work are not given the opportunity to try it because teachers believe they cannot handle it, a *sustaining expectation effect* is likely. In terms of interactions and relationships, the effects can be huge, as the expectation differences build year after year with many teachers (Trouilloud et al., 2006).

LESSONS FOR TEACHERS: COMMUNICATING APPROPRIATE EXPECTATIONS. Of course, not all teachers form inappropriate expectations or act on their expectations in unconstructive ways (Babad et al., 1982). The *Guidelines: Avoiding the Negative Effects of Teacher Expectations* may help you avoid some of these problems. But avoiding the problem might be more difficult than it seems. In general, low-expectation students also tend to be the most disruptive students. (Of course, low expectations can reinforce their desire to disrupt or misbehave.) Teachers may call on these students less, wait a shorter time for their answers, and give them less praise for right answers, partly to avoid the wrong, careless, or silly answers that can cause disruptions, delays, and digressions. The challenge is to deal with these very real threats to classroom management without communicating low expectations to some students or fostering their own low expectations of themselves. And sometimes, low expectations become part of the culture of the school—beliefs shared by teachers and administrators alike (Rubie-Davies et al., 2020; Weinstein et al., 1995).

GUIDELINES

Avoiding the Negative Effects of Teacher Expectations

Use information about students from tests, cumulative folders, parent communications, and other teachers very carefully.

Examples

1. Avoid reading cumulative folders early in the year.
2. Be critical and objective about the reports you hear from other teachers.
3. Be flexible in your expectations—a student's label or your judgment might be wrong.
4. Don't let communications from parents shape your expectations for their children—get to know the student.

Be flexible in your use of grouping strategies.

Examples

1. Review work of students often, and experiment with new groupings.
2. Use different groups for different subjects.
3. Use mixed-ability groups in cooperative exercises.

Provide both challenge and support.

Examples

1. Don't say, "This is easy, I know you can do it."
2. Offer a wide range of problems, and encourage all students to try a few of the harder ones for extra credit. Find something positive about these attempts.
3. Make sure your high expectations come with academic and emotional support for students' struggles. "Holding high standards without providing a warm environment is merely harsh. A warm environment without high standards lacks backbone" (Jussim, 2013).

Be especially careful about how you respond to low-achieving students during class discussions.

Examples

1. Give them prompts, cues, and time to answer.
2. Give ample praise for good answers.
3. Call on low achievers as often as you do high achievers.

Use materials that show a wide range of ethnic groups.

Examples

1. Check readers and library books. Is there ethnic diversity?
2. Ask students to research and create their own materials based on community or family sources.

Make sure that your teaching does not reflect racial, ethnic, or sexual stereotypes or prejudice.

Examples

1. Use a checking system to be sure you call on and include all students.
2. Monitor the content of the tasks you assign. Do boys get the "hard" math problems to work at the board? Do you avoid having students with limited English give oral presentations?

Be fair in evaluation and disciplinary procedures.

Examples

1. Make sure equal offenses receive equal punishment. Find out from students in an anonymous questionnaire whether you seem to be favoring certain individuals.
2. Try to grade student work without knowing the identity of the student. Ask another teacher to give you a "second opinion" from time to time.

Communicate to all students that you believe they can learn—and mean it.

Examples

1. Return papers that do not meet standards with specific suggestions for improvements.
2. If students do not have the answers immediately, wait, probe, and then help them think through an answer.

Involve all students in learning tasks and in privileges.

Examples

1. Use some system to make sure you give each student practice in reading, speaking, and answering questions.
2. Keep track of who gets to do what job. Are some students always on the list, whereas others seldom make it?

Monitor your nonverbal behavior.

Examples

1. Do you lean away or stand farther away from some students? Do some students get smiles when they approach your desk, whereas others get only frowns?
2. Does your tone of voice vary with different students?

For more information, see https://www.ascd.org/el/articles/are-you-communicating-high-expectations.

The Goal: Ambitious Teaching

High expectations for students are a critical ingredient in ambitious teaching. **Ambitious teaching** (or ambitious instruction) is a relatively recent term describing an approach to teaching grounded in challenging goals, complex but engaging tasks, and high-quality discussions building on students' ideas. The term is used most often to describe mathematics teaching, but all teachers can strive for ambitious instruction if they:

Ambitious teaching
An approach to teaching grounded in challenging goals, complex but engaging tasks, and high-quality discussions building on students' ideas.

- Have deep knowledge, especially of the *big ideas* in their field.
- Know their students well, including the *lives the students live* daily outside class and how they see the world.
- Know how to create teaching and learning spaces to *connect the big ideas of the subject matter with the lives of their students*.
- Hold high expectations that students' capabilities to learn far exceed what most people expect.
- Work together with students on rich academic content, authentic problems, puzzling natural events, and intriguing questions.
- Press students for critical thinking and explanations based on evidence (Grant & Gradwell, 2010; Reich, 2017).

In general, goals and expectations are *ambitious*. Teachers develop the deep-thinking processes their students need to take on intellectually demanding tasks and push their students to elaborate, clarify, support, and justify their ideas and problem solutions (Anagnostopoulos et al., 2020). If this reminds you of the *robust learning* we discussed in Cluster 9, you are right—A+ for remembering! For more information, see http://ambitiousscienceteaching.org.

Ambitious teaching requires careful planning—our next topic.

The First Step: Planning

Stop & Think Greta Morine-Dershimer (2006) asks which of the following are true about teacher planning:

Time is of the essence.	A little planning goes a long way.
Plans are made to be broken.	You can do it yourself.
Don't look back.	One size fits all.

Research on Planning

When you thought about the "What Would You Do?" challenge at the beginning of this cluster, you were planning. Planning influences what students will learn because planning transforms the available time and curriculum materials into activities, assignments, and tasks for students—*time is of the essence in planning*. When a teacher decides to devote 7 hours to language arts and 15 minutes to science in a given week, the students in that class will learn more language than science. Planning done at the beginning of the year is particularly important because many routines and patterns, such as time allocations, are established early (Weinstein & Novodvorsky, 2015). So *a little planning does go a long way* in terms of what will be taught and what will be learned.

Second, teachers engage in several levels of planning—by the year, term, unit, week, and day. All the levels must be coordinated. As you gain experience in teaching, it will be easier to coordinate these levels of planning and incorporate the state and district curriculum standards as well. Third, plans reduce—but do not eliminate—uncertainty in teaching. Planning must allow flexibility. So *plans are not made to be broken—but sometimes they need to be bent a bit*.

To plan creatively and flexibly, teachers need to have wide-ranging knowledge about students, their interests, their abilities, and the subjects being taught—ambitious teaching again. The plans of beginning teachers sometimes don't work because they lack knowledge about the students or the subject—they can't estimate how long it will take students to complete an activity, for example, or they stumble when asked for an explanation or a different example (Calderhead, 1996).

In planning, *you can do it yourself—but collaboration is better*. Working with other teachers and sharing ideas is one of the best experiences in teaching. Some educators think that a collaborative approach to planning used in Japan called *kenshu* or "mastery through study" is one reason why Japanese students do so well on international tests. In the United States and many other countries, kenshu is called **Lesson Study** (Wood, 2020). In Lesson Study, small groups of teachers complete cycles of setting goals for learning, examining relevant research and curriculum possibilities, and designing a model lesson. Next, one group member teaches the lesson while other teachers observe or gather data, maybe even interviewing students. The lesson is videorecorded so all members can review the video, analyze student responses, and improve the lesson further. Other teachers try the revised lesson, and more improvements follow. At the end of the school year, all the study groups may publish the results of their work, so Lesson Study is a form of professional development as well as curriculum development—both teaching and the curriculum get better and better (Lee & Tan, 2020). Information about "Lesson Study" and many examples of lesson plans are available on the Internet.

Lesson Study

As a group, teachers develop, test, improve, and retest lessons until they are satisfied with the final version.

But even great science lesson plans taken from a terrific website must be adapted to your situation. Some of the adaptation comes before you teach and some comes after. In fact, much of what experienced teachers know about planning comes from looking back—reflecting—on what worked and what didn't, so *DO look back* on your plans and grow professionally in the process. Collaborative reflection and revising lessons are major components of the kenshu or Lesson Study approach to planning.

Finally, there is no one model for effective planning. *One size does NOT fit all* in planning. Planning is a creative problem-solving process for experienced teachers; they know how to complete many lessons and can teach segments of lessons effectively, so for familiar lessons, they don't necessarily continue to follow the detailed lesson-planning models they learned during their teacher preparation programs, even if those detailed plans helped in the beginning.

No matter how you plan, you must have a learning goal in mind. We turn to this next.

Connect and Extend to PRAXIS II®

Instructional Objectives (II, B1)

Describe the key elements of behavioral and instructional objectives. Be able to write each type of objective for a content area that you expect to teach.

Learning Goals

It is difficult to get somewhere if you don't know where you are going. Similarly, it is difficult to plan a unit or lesson if you don't know the point—if you don't have a clear target. "Learning targets define academic success—they state what we want students to know and be able to do" (Chappuis & Stiggins, 2017, p. 42). Over the years, targets for student learning have been called goals and objectives, instructional objectives, Learning Objectives,

content standards, behavioral objectives, educational objectives, grade-level indicators, performance expectations, lesson objectives, competencies, curricular aims, benchmarks, and many other labels. Be sure to learn what language and labels are used in your school and district and what the labels actually mean (Popham, 2020).

AN EXAMPLE OF STATE-LEVEL GOALS: THE COMMON CORE. We hear quite a bit today about grand visions and goals for education such as "promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access" (U.S. Department of Education, 2021). But very general goals are meaningless as potential guidelines for your instruction. States may turn these grand goals into *standards* or *indicators.* No Child Left Behind mandated that states adopt their own content standards in mathematics and reading, so all 50 states did. But there were problems. For example, there were redundancies across grades or missing steps between grades. Also, there was great variation among the various states' standards in terms of rigor and difficulty. Most of these standards focused on basic proficiency, not the kinds of capabilities needed for 21st-century careers (Petrilli, 2020). To address these problems, beginning in 2009, the Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center) led an effort to define consistent national standards for each grade, K–12, in two broad areas: (a) English language arts and literacy in history/social studies, science, and technical subjects and (b) mathematics. Table 14.2 gives a few examples of Common Core State Standards in these areas.

State adoption of the Common Core State Standards is a moving target. Initially, 45 states, the District of Columbia, and four territories adopted the standards, and one more state, Minnesota, adopted just the English/language arts standards. Since then, four states have withdraw, and at least 12 states are in the process of withdrawing. Many states that are still using the Common Core State Standards have renamed them or altered them slightly. To see what your state is doing, go to your state's Department of Education web page and search for "standards."

Table 14.2 A Few Examples of the Common Core State Standards for Grades 6 and 11–12 in Literature, Writing, and Mathematics

SUBJECT AND SKILL	GRADE 6	GRADES 11 AND 12
Reading Literature: Key Ideas and Details	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
Writing: Research to Build and Present Knowledge	Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
Mathematics: Geometry	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

There is continuing debate about the value of the Common Core. Those who favor the standards note that we need higher, more consistent standards because the United States routinely performs near the bottom in international achievement tests. Students graduating under the older, basic skills standards were not really prepared for college and careers. In response to the Common Core standards, teaching materials, textbooks, and assessments are improving and becoming more aligned with the standards—we are testing what we teach. If we drop this effort altogether, we will lose the progress we have made (Calfee et al., 2014; Petrilli, 2020).

Criticisms of the Common Core include that the standards limit teachers' creativity, don't allow states and local districts to add their own content to the curriculum, and lead to too much testing. In addition, the standardized tests students are required to take often still are not aligned with the Common Core standards, so students are taught one thing and tested on another (Polikoff, 2015). As a political issue, there certainly is objection to the Common Core. In a survey of attitudes about the Common Core, Morgan Polikoff and his colleagues (2016) found that Republicans were 90% more likely than Democrats to oppose the standards. But the troubling bottom line is that there is little evidence that simply adopting the Common Core standards has raised student achievement, and even in studies that find some gain, the improvement is small, perhaps in part because the standards were implemented inconsistently (Loveless, 2020; Polikoff, 2020).

Beware of Either/Or. As a teacher you should be familiar with the standards in your state—they may be very close to the Common Core. These standards impact what is taught (curriculum materials, textbooks, course planning) and what is assessed in every grade. But remember, the standards are goals—they do not tell you how to teach, just what outcomes to aim for.

CLASSROOMS GOALS FOR LEARNING. Whatever the term—objectives, outcomes, targets, standards, indicators, or other labels—having a clear learning goal helps teachers avoid what Grant Wiggins and Jay McTighe (2006) call the "twin sins" of instructional design—*activity-focused teaching* (lots of hands-on, interesting activities—but no goal) and *coverage-focused teaching* (a forced march through the textbook—but no goal). In either case, learning can be lost if the teacher is not clear about why students are doing the activities or reading the texts. Frame your learning objectives broadly enough so they help organize your instruction but specifically enough to serve as a guide to your assessment; then test what you teach.

Flexible and Creative Plans—Using Taxonomies

Stop & Think Think about your assignments for one of your classes.

What kind of thinking is involved in doing the assignments:

- Remembering facts and terms?
- Understanding key ideas?
- Applying information to solve problems?
- Analyzing a situation, task, or problem?
- Making evaluations or giving opinions?
- Creating or designing something new?

Connect and Extend to PRAXIS II®

Taxonomies of Educational Objectives (II, B1)

Taxonomies influence every aspect of instruction from textbook design to lesson planning. List the major objectives of each of the taxonomies, and describe the focus of each objective. Be able to incorporate these objectives into instructional objectives that you design.

Taxonomy

Classification system.

In the 1950s, a group of experts in educational evaluation led by Benjamin Bloom set out to improve college and university examinations. The impact of their work has affected education at all levels around the world (Anderson & Sosniak, 1994). Bloom and his colleagues developed a **taxonomy**, or classification system, of educational outcomes divided into three domains: *cognitive, affective*, and *psychomotor*. In real life, of course, behaviors from these three domains occur simultaneously. While students are answering essay questions, they are writing or using a keyboard (psychomotor) and remembering or reasoning (cognitive) and also might have some emotional response to the task (affective), even if the major domain involved is cognitive (Popham, 2020).

THE COGNITIVE DOMAIN. Bloom's taxonomy of the thinking domain, or **cognitive domain**, was considered one of the most significant educational writings of the 20th century (Anderson & Sosniak, 1994). The six basic outcomes are *knowledge*, *comprehension*, *application*, *analysis*, *synthesis*, and *evaluation* (Bloom et al., 1956). It is common to consider these outcomes as a hierarchy, with each skill building on those below, but this is not entirely accurate, especially in subjects such as mathematics. Still, you will hear many references to *lower-level* and *higher-level* outcomes or objectives, with knowledge, comprehension, and application considered lower level and the other categories considered higher level. As a rough way of thinking about learning targets, this can be helpful. The taxonomy can also be useful in planning assessments because different procedures are appropriate for outcomes at the various levels, as you will see in Cluster 15.

Cognitive domain
In Bloom's taxonomy, memory and reasoning objectives.

In 2001, a group of educational researchers published the first major revision of the cognitive taxonomy, and this is the one we use today (Anderson & Krathwohl, 2001).

1. *Remembering:* Remembering or recognizing something without necessarily understanding, using, or changing it.
2. *Understanding:* Understanding the material being communicated without necessarily relating it to anything else.
3. *Applying:* Using a general concept to solve a particular problem.
4. *Analyzing:* Breaking something down into its parts.
5. *Evaluating:* Judging the value of materials or methods as they might be applied in a particular situation.
6. *Creating:* Creating something new by combining different ideas.

The 2001 revision of Bloom's taxonomy added a new dimension—to recognize that cognitive processes must process *something*, you have to remember or understand or apply some form of knowledge. If you look at Table 14.3, you will see the result. We now have the six processes of *remembering*, *understanding*, *applying*, *analyzing*, *evaluating*, and *creating* acting on four kinds of knowledge—*factual*, *conceptual*, *procedural*, and *metacognitive*.

Consider how this revised taxonomy might suggest learning targets for a social studies/language arts class. Here's an example that targets *analyzing conceptual knowledge*:

> After reading a historical account of the battle of the Alamo, students will be able to explain the author's point of view or bias.

And here's an outcome for *evaluating metacognitive knowledge*:

> Students will reflect on and describe their strategies for identifying the biases of the author.

Go to https://tips.uark.edu and search for "Bloom's taxonomy" for more explanations and examples.

Table 14.3 A Revised Taxonomy in the Cognitive Domain

The revised taxonomy includes cognitive processes operating on different kinds of knowledge. The verbs in the chart are examples of what might be used to create objectives.

THE COGNITIVE PROCESS DIMENSION						
THE KNOWLEDGE DIMENSION	**1. REMEMBER**	**2. UNDERSTAND**	**3. APPLY**	**4. ANALYZE**	**5. EVALUATE**	**6. CREATE**
A. Factual Knowledge	list	summarize	classify	order	rank	combine
B. Conceptual Knowledge	describe	interpret	experiment	explain	assess	plan
C. Procedural Knowledge	tabulate	predict	calculate	differentiate	conclude	compose
D. Metacognitive Knowledge	appropriate use	execute	select strategy	change strategy	reflect	invent strategy

Source: Anderson\Krathwohl\Airasian\Cruikshank\Mayer\Pintrich\Raths\Wittrock. *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*, Abridged Edition, 1st edition, © 2001. Reprinted by permission of Pearson Education, Inc. NJ.

Affective domain
Objectives focusing on attitudes and feelings.

THE AFFECTIVE DOMAIN. The Learning Objectives in the **affective domain**, or domain of emotional response, have not yet been revised from the original version. These outcomes run from least to most committed (Krathwohl et al., 1964). The affective domain has five basic Learning Objectives:

1. *Receiving:* Being aware of or attending to something in the environment.
2. *Responding:* Showing some new behavior as a result of experience.
3. *Valuing:* Showing some definite involvement or commitment.
4. *Organization:* Integrating a new value into your general set of values, giving it some ranking among your general priorities.
5. *Characterization by value:* Acting consistently with the new value.

For example, an outcome for a nutrition class at the *valuing* level (showing involvement or commitment) might be stated: "After completing the unit on food contents and labeling, at least 50% of the class will commit to the junk food boycott project by giving up fast food for a month."

Psychomotor domain
Physical ability and coordination objectives.

THE PSYCHOMOTOR DOMAIN. James Cangelosi (1990) provided a useful way to think about outcomes in the **psychomotor domain**, or realm of physical ability, as either (a) voluntary muscle capabilities that require endurance, strength, flexibility, agility, or speed or (b) the ability to perform a specific skill.

Here are two psychomotor outcomes:

Four minutes after completing a 1-mile run in 8 minutes or under, your heart rate will be below 120.

Use a computer trackpad effectively to "drag and drop" files.

The Cognitive Demands of Learning Objectives: Webb's Depth of Knowledge

Webb's Depth of Knowledge (DOK)
A taxonomy system similar to Bloom's cognitive domain in that it moves from lower- to higher-level thinking; often is used in planning curriculum and assessments around the Common Core State Standards.

Norman Webb (2002) devised a classification system for Learning Objectives based on the cognitive demands—the complexity of the thinking involved. Complexity is not the same as difficulty. Remembering a whole page of dialogue may be difficult but not complex—you just memorize the exact words without in-depth thinking. **Webb's Depth of Knowledge (DOK)** system is similar to Bloom's cognitive domain taxonomy in that it moves from lower- to higher-level thinking. The system often is used in planning curriculum and assessments around the Common Core State Standards (Hess, 2013). Table 14.4 shows the four levels of Webb's DOK and some examples.

The *Guidelines: Using Learning Objectives* should help you if you use goals for every lesson or even for just a few assignments.

Planning from a Constructivist Perspective

Stop & Think Think about the same course assignments you analyzed in the previous *Stop & Think.* What are the big ideas that run through all those assignments? What other ways could you learn about those ideas besides the assignments?

Constructivist approach
See *constructivism*.

Traditionally, it has been the teacher's responsibility to do most of the planning for instruction, but new ways of planning are emerging. In **constructivist approaches**, planning is shared and negotiated. The teacher and students together make decisions about content, activities, and approaches. Rather than having specific student behaviors and skills as outcomes, the teacher has overarching goals—big ideas, essential questions, or themes—that guide planning (Borich, 2011). These goals are understandings or abilities that the teacher returns to again and again. Since the 1990s, teaching with themes and integrated content has been a major element in planning and designing lessons

Table 14.4 Webb's Depth of Knowledge Levels

DOK LEVELS	DESCRIPTION	EXAMPLE VERBS	EXAMPLE ACTIVITIES
Recall and Reproduce	Working with facts, terms, simple procedures, or formulas; no transformation of information; no "figuring it out." You know it or you don't.	Calculate, report, describe, tell, list, draw, define, memorize, match, retell, measure, find, recall	Describe in your own words; make a chart or timeline; spellcheck a paragraph; look up words in a dictionary; follow steps; underline new words in a sentence; perform basic calculations; brainstorm ideas for a class project
Skill/Concept	Demonstrating conceptual understanding by explaining or making a model; converting from one form of information to another; explaining why or how	Infer, estimate, interpret, distinguish, predict, compare-contrast	Multi-step calculations; explain the meaning of a concept; make a working model; design a portfolio for your work
Strategic Thinking and Reasoning	Using analysis and evaluation to solve real-world problems; supporting ideas with evidence; integrating knowledge from several subject matter areas to create a solution or design	Plan, differentiate, cite evidence, refute, generalize, analyze, develop	Create a database; design a website; write a short story; write and record a podcast
Extended Thinking	Strategic thinking and problem solving over time; complex planning; adjusting plans to fit new circumstances; synthesis and reflection	Design and conduct, synthesize, collaborate, self-evaluate and reflect	Create and perform a work for an audience; research a topic and write a report; develop and test multiple hypotheses and draw conclusions

Source: Based on Hess, K. (2013). *A guide for using Webb's Depth of Knowledge with Common Core State Standards*. The Common Core Institute; Popham, W. J. (2020). *Classroom assessment: What teachers need to know* (9th ed.). Pearson; Petit, M., & Hess, K. (2006). *Applying Webb's Depth of Knowledge and NAEP levels of complexity in mathematics*. Marge Petit & Karin K. Hess, Center for Assessment. Permission to reproduce is given when authorship is fully cited khess@nciea.org

GUIDELINES

Using Learning Objectives

Avoid "word magic"—phrases that sound noble and important but say very little, such as "Students will become deep thinkers."

Examples

1. Keep the focus on specific changes that will take place in the students' knowledge and skills.
2. Ask students to explain the meaning of the learning targets. If they can't give specific examples of what you mean, the targets are not communicating your intentions to your students.

Suit the activities to the target.

Examples

1. If the goal is the memorization of vocabulary, give the students memory aids and practice exercises.
2. If the goal is the ability to develop well-thought-out positions, consider position papers, debates, projects, or mock trials.
3. If you want students to become better writers, give many opportunities for writing and rewriting.

Make sure your tests are related to your targets.

Examples

1. Write learning targets and rough drafts for tests at the same time. Revise these drafts of tests as the units unfold and targets change.
2. Weight the tests according to the importance of the various targets and the time spent on each.

Table 14.5 Some Themes and Essential Questions for Integrated Planning for Middle and High School Students

THEMES	ESSENTIAL QUESTIONS
Courage	How are acts of courage revealed in our community?
Diversity and Variation	Why is it important to understand different cultures?
Survival	How can we deal with the diminishing resources on earth?
Groups and Institutions	Why do people live in communities?
Communities of the Future	What is the future of big cities?
Communication/Language	Who is entitled to own the airways?
Human Rights and Responsibilities	What are human beings' responsibilities about climate?
Identity/Coming of Age	How do people choose friends?
Interdependence	In what ways do animals, including humans, and plants depend on each other?
Change and Conservation	Why do people recycle or not recycle?
Probability and Prediction	How can probability be used in real life to predict the future?

Source: Based on Clarke, J. H. & Agne, R. M. (1997). *Curriculum development: Interdisciplinary high school teaching*. Pearson; and Thompson, G. (1991). *Teaching through themes.* Scholastic.

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Planning Thematic Units (II, A2)

Thematic learning units that integrate two or more content areas have become common in modern classrooms. Describe the principles involved in designing these activities, and explain how student learning can be assessed.

and units from kindergarten (Roskos & Neuman, 1998) through high school (Clarke & Agne, 1997). In Cluster 12, you saw an example of a whole school that used the theme of "working in harmony" as a big idea for planning across grades K through 12 (Beard, 2015). Some other topics for integrating themes with younger children are people, friendship, communications, habitats, communities, and patterns. Possibilities for older students are given in Table 14.5. For more ideas about "essential questions," search that term on Google.

Let's assume you have some clear, valuable learning targets. You still need to decide what's happening on Monday. You need to design teaching that is appropriate for your goals.

Module 43 Summary

Research on Teaching (pp. 608–615)

What methods have been used to study teaching? For years, researchers have tried to unravel the mystery of effective teaching using classroom observation, case studies, interviews, experimentation with different methods, stimulated recall (teachers view videotapes and explain their teaching), analysis of lesson transcripts, and other approaches to study teaching in real classrooms.

What are the general characteristics of good teaching? A variety of teacher qualities are related to good teaching. Research suggests teachers who receive proper training and certification have more successful students. Although it is important, teacher knowledge of a subject is not sufficient for effective teaching. Thorough knowledge does lead to greater clarity and better organization, which are both tied to good teaching. Teachers who provide clear presentations and explanations tend to have students who learn more and who rate their teachers more positively. Teacher warmth, friendliness, and understanding seem to be the traits most strongly related to positive student attitudes about the teacher and the course in general.

What do expert teachers know? It takes time and experience to become an expert teacher. These teachers have a rich store of well-organized knowledge about the many specific situations of teaching. This knowledge is very complex and specific to the *situation, topic, students*, and even

the individual *teacher*. Within the particular situation and topic, expert teachers have clear goals and take individual differences into account when planning for their students. Expert teachers also know how to be reflective practitioners—how to use their experience as a way to grow and improve in their teaching.

What are some sources of teacher expectations? Sources include language or immigrant status, gender, notes from previous teachers, medical or psychological reports found in cumulative folders, ethnic background, prior knowledge about older brothers and sisters, physical characteristics, previous achievement or IQ scores, SES, parents' status or behaviors, and the actual behaviors of the student.

What are the two kinds of expectation effects, and how do they happen? The first is the self-fulfilling prophecy, in which the teacher's beliefs about the students' abilities have no basis in fact, but student behavior comes to match the initially inaccurate expectation. The second is a sustaining expectation effect, in which teachers are fairly accurate in their initial reading of students' abilities and respond to students appropriately, but they do not alter their expectations to take account of any improvement. When this happens, the teacher's unchanging expectation can sustain the student's achievement at the expected level. In practice, sustaining effects are more common than self-fulfilling prophecy effects.

What are the different avenues for communicating teacher expectations? Some teachers tend to treat students differently, depending on their own views of how well the students are likely to do. Differences in treatment toward low-expectation students may include setting less challenging lessons, focusing on lower-level learning, giving fewer choices, providing inconsistent feedback, and communicating less respect and trust. Students may behave accordingly, fulfilling teachers' predictions or staying at an expected level of achievement.

The First Step: Planning (pp. 615–622)

What are the levels of planning, and how do they affect teaching? Teachers engage in several levels of planning—by the year, term, unit, week, and day. All the levels must be coordinated. The plan determines how time and materials will be turned into activities for students. There is no single model of planning, but all plans should allow for flexibility. Planning is a creative problem-solving process for experienced teachers. It is more informal—"in their heads."

What is the Common Core? To address problems with inconsistency, lack of rigor, and redundancies in many state-level standards, beginning in 2009, the Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA Center) led an effort to define consistent national standards for each grade, K–12, in two broad areas: (a) English language arts and literacy in history/social studies, science, and technical subjects and (b) mathematics. Today adoption of the Common Core is a moving target. Make sure you learn about the standards in your state.

What is a learning target, and what are the three taxonomies of educational outcomes? Learning targets tell what students should know and be able to do—what successful learning would look like. Bloom and others have developed taxonomies categorizing basic objectives in the cognitive, affective, and psychomotor domains. A taxonomy encourages systematic thinking about relevant targets and ways to evaluate them. Six outcomes objectives are listed in the cognitive domain: remembering, understanding, applying, analyzing, evaluating, and creating, acting on four kinds of knowledge: factual, conceptual, procedural, and metacognitive. Outcomes in the affective domain run from least committed to most committed. Outcomes in the psychomotor domain generally move from basic perceptions and reflex actions to skilled, creative movements. A more concise way to think about Learning Objectives is to target knowledge, reasoning, performance skills, products, or dispositions.

Describe constructivist planning. Planning is shared and negotiated in constructivist approaches. Rather than having specific student behaviors as objectives, the teacher has overarching goals or "big ideas" that guide planning. Integrated content and teaching with themes or essential questions are often part of the planning. Assessment of learning is ongoing and mutually shared by teacher and students.

MODULE 44 Teaching Every Student

Learning Objective 14.3 Discuss the appropriate uses of direct instruction, independent work, homework, questioning (particularly authentic questions), feedback, dialogue, and group discussion and explain how to use Understanding by Design to integrate Learning Objectives, evidence for reaching those outcomes, and teaching strategies.

Learning Objective 14.4 Define differentiated instruction and apply this approach to teaching a diverse group of students, including how to apply the guidelines of universal design for learning in your teaching.

Teaching Approaches

For many people, "teaching" means an instructor explaining material to students; lecture is a classic form, but there are many other possibilities. In this section, you will learn some basic formats for putting teaching plans into action. Of course, different methods may be more or less appropriate, depending on the subject, the students' prior knowledge, and the particular learning goals. We begin with strategies for teaching explicit facts and concepts.

Research on Teaching Strategies

As you saw earlier, there was an explosion of research on teaching in the 1970s and 1980s. This early work identified a number of general teaching strategies that were associated with student learning (Emmer et al., 1980; Good, Biddle, & Brophy, 1975; Good & Grouws, 1975; Rosenshine & Stevens, 1986). The results still stand strong today. These enduring effective general strategies include:

- Communication of clear learning goals,
- Effective use of time so students have ample opportunities to learn material at the right difficulty level,
- Proactive and caring classroom management,
- Clear explanations with examples/nonexamples,
- Teaching that focuses on meaning and also provides guided and independent practice,
- Frequent checks for student understanding with immediate effective feedback, and
- A curriculum aligned with the learning goals and the assessments used to measure those goals.

The results of the early research on teaching identified a model that was related to improved student learning as assessed by standardized tests—*direct instruction*.

Direct instruction/Explicit teaching
Systematic instruction for mastery of basic skills, facts, and information.

Active teaching
Teaching characterized by high levels of teacher explanation, demonstration, and interaction with students.

Explicit Teaching and Direct Instruction

Barak Rosenshine and Robert Stevens (1986) called this approach **direct instruction** or **explicit teaching**. Tom Good (1983a) used the term **active teaching** to describe a similar approach.

Researchers identified the elements of direct instruction by comparing teachers whose students learned more than expected (based on entering knowledge) with teachers whose students performed at an expected or average level. Because the focus was on traditional forms of teaching in U.S. classrooms, the research could not identify successful innovations. Effectiveness was usually defined as average improvement in standardized test scores for a whole class or school, so the results hold for large groups, but not necessarily for every student in the group. Even when the average achievement of a group improves, the achievement of some individuals may decline (Good, 1996; Shuell, 1996).

Given these conditions, you can see that direct instruction applies best to the teaching of **basic skills**—clearly structured knowledge and essential skills, such as science facts, mathematics computations, reading vocabulary, and grammar rules (Rosenshine & Stevens, 1986). These skills involve tasks that are relatively unambiguous, so they can be taught step-by-step and evaluated by standardized tests. How would a teacher turn these themes into actions?

ROSENSHINE'S SIX TEACHING FUNCTIONS. Rosenshine and his colleagues (Rosenshine, 1988; Rosenshine & Stevens, 1986) identified six teaching functions based on the research on effective instruction. These could serve as a checklist or framework for teaching basic skills.

1. *Review and check the previous day's work.* Reteach if students misunderstood or made errors.
2. *Present new material.* Make the purpose clear, teach in small steps, and provide many examples and nonexamples of the ideas and concepts you are teaching.
3. *Provide guided practice.* Question students, give practice problems, and listen for misconceptions and misunderstandings. Reteach if necessary. Continue guided practice until students answer about 80% of the questions correctly.
4. *Give feedback and correctives based on student answers.* Reteach if necessary. (Remember, quality feedback is an element of most models of effective teaching.)
5. *Provide independent practice.* Let students apply the new learning on their own, in cooperative groups or as homework. The success rate during independent practice should be about 95%. The point is for the students to practice until the skills become overlearned and automatic—until the students are confident. Hold students accountable for the work they do—check it.
6. *Review weekly and monthly to consolidate learning.* Include some review items as homework. Test often, and reteach material missed on the tests.

These six functions are not steps to be followed in a particular order, but all of them are elements of effective instruction. For example, feedback, review, and reteaching should occur whenever necessary and should match the abilities of the students. Also, keep in mind the age and prior knowledge of your students. For younger or the less prepared students, use *more* and *shorter* cycles of presentation, guided practice, feedback, and correctives.

WHY DOES DIRECT INSTRUCTION WORK? Well-organized presentations with clear explanations and reviews can all help students construct understandings. For example, reviews activate prior knowledge, so the student is ready to understand. Brief, clear presentations and guided practice manage students' cognitive load and avoid taxing their working memories. Numerous examples and nonexamples that highlight similarities and differences give many pathways and associations for building networks of connected concepts. Guided practice can also give the teacher a snapshot of the students' thinking as well as their misconceptions, so these can be addressed directly as misconceptions rather than simply as "wrong answers."

Teacher explanation is useful for communicating a large amount of material to many students in a short period of time, introducing a new topic, giving background information, or motivating students to learn more on their own. Teacher presentations are therefore most appropriate at the lower levels of the taxonomies described earlier: for remembering, understanding, applying, receiving, responding, and valuing. Every subject, even college English or chemistry, requires some direct instruction. Students may need some direct instruction in how to use various manipulative materials so they can actually learn from (not just play with) the materials. Students working in cooperative groups may need guidance, modeling, and practice in how to ask questions and give explanations. And to solve difficult problems, students may need some direct instruction in possible problem-solving strategies (Arends, 2014).

EVALUATING DIRECT INSTRUCTION. Direct instruction, particularly when it involves extended teacher presentations or lectures, has some disadvantages. You may find that some students have trouble listening for more than a few minutes at a time and that they simply

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Teacher-Centered Instruction (II, A3)

Teacher-centered instruction is often thought of as the "traditional" approach to instruction. In what situations is this instructional format most effective? What are the basic steps involved in carrying out this form of instruction?

Basic skills

Clearly structured knowledge that is needed for later learning and that can be taught step-by-step.

Table 14.6 Active Learning and Teacher Presentations

Here are some ideas for keeping students cognitively engaged during teacher presentations. They can be adapted for many ages.

Write an Answer: Pose a question, ask everyone to write a brief answer, and then call on students to share what they wrote.	**Voting:** Pose two alternative explanations; ask how many agree with each (may be a good idea to ask the students to close their eyes and vote so they won't be swayed by the votes of others).
I used to think _____, but now I know _____: After a lesson, ask students to fill in the blanks and then share their results with the person beside them.	**Choral Response:** Have the whole class restate in unison important facts and ideas, such as "In a right triangle, $a^2 + b^2 = c^2$."
Think-Pair-Share: Pose a question, have students think of an answer on their own and then consult with a neighbor to improve the answer, and then ask volunteers to share their ideas.	**One-Minute-Write:** After a section of the lesson, students write for 1 minute to summarize the key points or raise a question about what is not clear to them.

tune you out. Teacher presentations can put the students in a passive position by doing much of the cognitive work for them; this may prevent students from asking or even thinking of questions (Freiberg & Driscoll, 2005). Critics also claim that direct instruction is based on the wrong theory of learning. Teachers break material into small segments, present each segment clearly, and reinforce or correct, thus transmitting accurate understandings from teacher to student. The student is viewed as an "empty vessel" waiting to be filled with knowledge rather than an active constructor of knowledge (Berg & Clough, 1991; Driscoll, 2005).

Unfortunately, for younger and less prepared learners, without teacher guidance, the understandings that students construct can be incomplete and misleading (Sweller et al., 2007). But done well, direct instruction and explanation can help all students learn actively, not passively (Leinhardt, 2001). **Scripted cooperation** is one way of incorporating active learning into lectures. Several times during the presentation, the teacher asks students to work in pairs. One person is the summarizer, and the other critiques the summary; then they switch roles for the next summary/critique. This gives students a chance to check their understanding, organize their thinking, and translate ideas into their own words. Other possibilities are described in Table 14.6.

Scripted cooperation
Learning strategy in which two students take turns summarizing material and critiquing the summaries.

Deanna Kuhn (2007) said it well:

> As for direct instruction, of course it has a place. Each young student does not need to reinvent knowledge from the ground up. The challenge is to formulate what we want direct instruction to be. In doing so, it is well to keep in mind that it is students who construct meaning from such instruction and decide what it is that they will learn. (p. 112)

See the *Guidelines: Effective Direct Instruction* for more ideas about teaching effectively.

GUIDELINES

Effective Direct Instruction

Use a number of examples.

Examples

1. In mathematics class, ask students to point out all the examples of right angles that they can find in the room.
2. In teaching about islands and peninsulas, use maps, slides, models, or postcards.

Organize your lessons carefully.

Examples

1. Provide objectives that help students focus on the purpose of the lesson.
2. Begin lessons by writing a brief outline on the board, or work on an outline with the class as part of the lesson.

3. If possible, break the presentation into clear steps or stages.
4. Review periodically.

Anticipate and plan for difficult parts in the lesson.

Examples

1. Plan a clear introduction to the lesson that tells students what they are going to learn and how they will learn it.
2. Do the exercises and anticipate student problems—consult the teachers' manual for ideas.
3. Have definitions ready for new terms, and prepare several relevant examples for concepts.
4. Think of analogies that will make ideas easier to understand.
5. Organize the lesson in a logical sequence; include checkpoints that incorporate oral or written questions or problems to make sure the students are following the explanations.

Strive for clear explanations.

Examples

1. Avoid vague words and ambiguous phrases: Steer clear of "the *somes*"—*something, someone, sometime, somehow*; "the *not verys*"—*not very much, not very well, not very hard, not very often*; and other unspecific fillers, such as *most, not all, sort of, and so on, of course, as you know, I guess, in fact, or whatever*, and *more or less.*
2. Use specific (and, if possible, colorful) names instead of *it, them*, and *thing*.
3. Refrain from using pet phrases such as *you know, like*, and *Okay*?
4. Record one of your lessons to check yourself for clarity.
5. Give explanations at several levels so all students, not just the brightest, will understand.
6. Focus on one idea at a time, and avoid digressions.

Make clear connections by using explanatory links such as *because, if–then*, or *therefore*.

Examples

1. "The North had an advantage in the Civil War because its economy was based on manufacturing."
2. Explanatory links are also helpful in labeling visual material such as graphs, concept maps, or illustrations.

Signal transitions from one major topic to another with phrases.

Examples

1. Use wording like "The next area," "Now we will turn to," and "The second step is."
2. Outline topics, listing key points, drawing concept maps on the board, or using an overhead projector.

Communicate an enthusiasm for your subject and the day's lesson.

Examples

1. Tell students why the lesson is important. Have a better reason than "This will be on the test" or "You will need to know it next year." Emphasize the value of the learning itself.
2. Be sure to make eye contact with the students.
3. Vary your pace and volume in speaking. Use silence for emphasis.

Independent Work and Homework

You may have heard the term *seatwork,* but the more current name is *independent work*—you know students can work many other places besides their "seats" because today they may not have assigned seats in class.

INDEPENDENT WORK. Independent classroom-desk work is often overused. For example, a summary of research from 1975 to 2000 found that students with learning disabilities, who

often have trouble improving without teacher guidance, were spending about 40% of their time on independent work (Vaughn et al., 2002).

Independent work should follow up a lesson and give students supervised practice with quick feedback. It should not be the main mode of instruction. Unfortunately, many workbook pages and worksheets do little to support the learning of important goals. Before you make an assignment, ask yourself, "Does doing this work help students learn anything that matters?" Students should be able to see the connection between the independent work and the lesson. Tell them why they are doing the work. The goals should be clear, all the materials that might be needed should be provided, and the work should be moderately difficult—doable but neither too easy nor too hard. When independent work is too easy, students are not cognitively engaged. When the work is too difficult, students often resort to guessing or copying someone else's answers just to finish.

There are several alternatives to workbooks and worksheets, such as reading silently and reading aloud to a partner; writing for a "real" audience; writing letters or journals; transcribing conversations and punctuating them properly; making up problems; working on long-term projects and reports; solving brainteasers and puzzles; and computer activities (Romano, & Weinstein, 2019). One of my favorites is creating a group story. Two students begin a story on the computer. Then two more add a paragraph. The story grows with each new pair's addition. The students are reading and writing, editing and improving. With so many different authors, each writer may spark the creative thinking of other contributors.

Any independent work requires careful monitoring. Being available to students doing the work is more effective than offering students help before they ask for it. Short, frequent contacts are best (Brophy & Good, 1986). Sometimes you may be working with a small group while other students do independent work. In these situations, it is especially important for students to know what to do if they need help. One expert teacher described by Romano and Weinstein (2019) taught students a rule, "Ask three, then me." Students have to consult three classmates before seeking help from the teacher. This teacher also spends time early in the year showing students how to help each other—how to ask questions and how to explain.

Stop & Think Think back to your elementary and high school days. Do you remember any homework assignments? What sticks in your mind about those assignments?

HOMEWORK. Like so many methods in education, homework has moved in and out of favor. In the early 1900s, homework was viewed as an important path to mental discipline, but by the 1940s, it was criticized as too much drill and low-level learning. Then, in the 1950s, homework was rediscovered as a way to catch up with the Soviet Union in science and mathematics, only to be seen as putting too much pressure on students during the more laid-back 1960s. By the 1980s, homework was in again as a way to improve the standing of American children compared with students around the world (Cooper & Valentine, 2001). As our *first-grade* granddaughter worked on her spelling, reading, and math homework (she had assignments every day), I wondered again about the value of homework. No need to guess—educators have been studying the effects of homework for over 75 years (Cooper, 2004, 2007; Cooper et al., 2006; Epstein & Van Voorhis, 2012; Fitzmaurice et al., 2020; Flunger et al., 2015; Kalenkoski & Pabilonia, 2014; Trautwein, 2007). Most of the studies involved math and reading or English homework but not social studies, science, or other subjects. What have they shown? The *Point/Counterpoint: Is Homework Valuable?* gives some answers.

POINT/COUNTERPOINT: Is Homework Valuable?

Were all those hours you spent doing your own homework or supervising the work of others really worth it? It depends. . . .

Point

Often homework is not valuable. David Berliner and Gene Glass (2014) said it bluntly: "Let the dog eat it. Homework does not boost achievement" (p. 113). No matter how interesting an activity is, students will eventually get bored with it—so why give them work both in and out of school? They will simply grow weary of learning. And important opportunities are lost for community involvement or leisure activities that would create well-rounded citizens. When parents help with homework, they can do more harm than good—sometimes confusing their children or teaching them incorrectly. And students from poorer families often must work at jobs after school, so they miss doing the homework; then the learning discrepancy between the rich and poor grows even greater. Besides, the research is inconsistent about the effects of homework. For example, one study found that in-class work was better than homework in helping elementary students learn (Cooper & Valentine, 2001). Harris Cooper and his colleagues (2006; Harris Cooper, 2007) reviewed many studies of homework and concluded that there is little relationship between homework and learning for young students, but the relationship between homework and achievement grows progressively stronger for older students. Young students may be too distracted by elements of their home environment (toys, TV, games, siblings, etc.) and lack the metacognitive skills to focus their attention in the midst of distractions or manage their time. As a consequence of these concerns, many school districts are reviewing their homework policies to make sure homework is more meaningful and give families more time for other activities (Pinsker, 2019).

Counterpoint

There is a place for homework. Most research examines the relationship between *amount of time* spent on homework (as reported by students or parents) and achievement in terms of grades or tests. Evidence indicates that students in high school who do more homework (and watch less television after school) have higher grades, even when other factors such as gender, grade level, ethnicity, socioeconomic status (SES), and amount of adult supervision are taken into consideration (Cooper et al., 2006; Cooper & Valentine, 2001; Cooper, Valentine et al., 1999). High school girls spend about 1 hour more per week on homework than boys, even taking into account ability, parents' help, outside activities such as jobs, and type of coursework. One suggestion is that this additional time spent studying is a factor causing the gender gap that favors girls in college admission and completion—the girls know how to study (Gershenson & Holt, 2015).

Consistent with all these findings, the National Education Association suggests a "10-minute rule," which means 10 minutes of homework per night starting in the first grade and increasing by 10 minutes each grade, so a 12th-grader would be assigned about 120 minutes of homework per night (Walker, 2017).

But here is the possible problem with just thinking of homework in terms of time: Not every student takes the same time to do the same homework. Another approach is to focus on effort instead of time. Students' self-reported effort on homework is consistently and positively related to student achievement (Trautwein et al., 2009). "High homework effort means that a student does his or her best to solve the tasks assigned. There need not be a close relationship between effort and time on homework: A student putting as much effort as possible into a homework assignment might finish in 5 min or still be working after an hour" (Trautwein & Lüdtke, 2007, p. 432).

(Continued)

Barbara Flunger and her colleagues (2015) identified 5 types of learners in eighth grade based on their homework effort (persistence and compliance) and time spent. *Fast learners* invested good effort to complete homework quickly. *High-effort learners* invested great effort and more time in homework, while *average learners* invested some effort and little time. *Struggling learners* had trouble investing effort but spent high levels of time on homework. Then there were *minimalists*, who invested little effort or time. As you might predict, the fast learners and high-effort learners did significantly better over the year in terms of grades and test scores. Also, it is not surprising that students who are interested in their homework and believe it is valuable for their learning are more engaged in the work, and this engagement is associated with higher achievement (Rodríguez et al., 2019).

Beware of Either/Or

Even with the changes in attitudes toward homework over the years, the homework load for middle and high school students has not changed much since the mid-1980s. Upper elementary students seem to have increased homework, however (Loveless, 2014). The real question is not about assigning homework versus not assigning homework, but rather assigning the right kind of homework to the right learners. Students are more likely to put in effort if they see the homework as interesting, valuable, reasonably challenging, and not anxiety provoking—this could require some differentiated homework assignments (Dettmers et al., 2010). So the challenge is to get students to put their best efforts into appropriate homework and to not assign homework that is low quality. Time spent struggling is not time well spent.

To benefit from homework, students must understand the assignment. It may help to do the first few questions as a class to clear up any misconceptions. This is especially important for students who may have no one at home to consult if they have problems with the assignment. A second way to keep students involved is to hold them accountable for completing the work correctly, not just for filling in the page. This means the work should be checked, the students given a chance to correct the errors or revise work, and the results counted toward the class grade. Expert teachers often have ways of correcting homework quickly during the first minutes of class by having students check each other's or their own work.

If students get stuck on homework, they need help at home, someone who can scaffold their work without just "giving the answer" (Pressley, 1995). But many families don't know how to help (Hoover-Dempsey et al., 2001). The *Guidelines: Family and Community Partnerships—Homework* provide ideas for helping families deal with homework. But no matter what, be prepared for some parent complaints. In a study of parents' attitudes toward homework, 15% wanted less and 25% wanted more, but thankfully, 60% felt the amount of homework assigned was just right (Loveless, 2014).

GUIDELINES

Family and Community Partnerships

Homework

Make sure families know what students are expected to learn.

Examples

1. At the beginning of a unit, send home a list of the main objectives, examples of major assignments, key due dates, a homework "calendar," and a list of free resources available at libraries or on the Internet.
2. Provide a clear, concise description of your homework policy, including how homework is counted toward class grades, as well as consequences for late, forgotten, or missing homework.

Help families find a comfortable and helpful role in their child's homework.

Examples

1. Have some homework assignments that are fun and involve the whole family—puzzles, family albums, watching a television program together and doing a "review."
2. In conferences, ask families how you could help them to support their child in completing and learning from homework. Checklists? Background reading? Websites? Explanations of study skills?

Encourage parents to help structure the home for homework without becoming controlling and punitive or intrusive (Dumont et al., 2014).

Examples

1. Remind families that "helping with homework" means encouraging, listening, monitoring, praising, discussing, brainstorming—not punishing, harassing, threatening, helping when help isn't needed, or doing the work for their child.
2. Encourage families to set aside a quiet time and place for everyone in the family to study. Make this time a regular part of the daily routine.
3. Encourage parents to focus on modeling and supporting time management and persistence skills in doing homework: homework before play, friends, TV, games, or screen time.
4. Make sure the needed materials are all available so the child won't interrupt homework to find a pen or ruler.

Solicit and use suggestions from families about homework.

Examples

1. Find out what responsibilities the child has at home—how much time is available for homework.
2. Periodically, have a "homework hotline" for call-in questions and suggestions.

If no one is at home to help with homework, set up other support systems.

Examples

1. Assign study buddies who can be available over the phone.
2. If students have computers, provide lists of Internet helplines.
3. Locate free help in public libraries, and make these resources known.

Take advantage of family and community "funds of knowledge" to connect homework with life in the community and life in the community with lessons in school (Moll et al., 1992).

Examples

1. Create a class lesson about how family members use math and reading in sewing and in house construction (Epstein & Van Voorhis, 2001).
2. Design interactive homework projects that families do together to evaluate needed products for their home, for example, deciding on the best buy on shampoo or paper towels.

Questioning, Discussion, Dialogue, and Feedback

Teachers pose questions, students answer. This form of teaching, sometimes called *recitation*, has been with us for many years (Romano & Weinstein, 2019). The pattern from the teacher's point of view consists of IRF: *Initiation* (teacher asks questions), *Response* (student answers), and *Follow-up* (praising, correcting, probing, or expanding) (Burbules & Bruce, 2001; Gillies, 2016). These steps are repeated over and over. As you will see later, there are other ways of thinking about discussion, but for now let's consider the heart of recitation—the *initiation*, or questioning, phase. Good questions are important for many kinds of quality teaching.

Effective, authentic questions may be among the most powerful teaching tools to keep students cognitively engaged. Questions play several roles in cognition. They can help students rehearse information for effective recall. They can work to identify gaps in students' knowledge, provoke curiosity, and nurture long-term interest. They can initiate cognitive conflict and promote the disequilibrium that results in a changed knowledge structure.

Connect and Extend to PRAXIS II®

Questioning (III, C)

Effective questioning skills are among the most valuable skills a teacher can possess—and among the most difficult to develop. For guidance on asking effective questions in the classroom, read *Question Types* (https://teaching.uchicago.edu/resources/teaching-strategies/asking-effective-questions/).

They can serve as cues, tips, or reminders as an expert guides a novice in a learning experience. Students as well as teachers should learn to question effectively. I tell my students that the first step in doing a good research project is asking a good question. For now, we will focus on teachers' questions. Many of the beginning teachers I work with are surprised to discover how valuable good questions can be and how difficult they are to create.

Stop & Think Think back to your most recent class. What kinds of questions did your professor ask? What sort of thinking was required to answer the questions: remembering, understanding, applying, analyzing, evaluating, or creating? How long did the professor wait for an answer?

Convergent questions
Questions with only one right answer—usually factual questions or rote knowledge questions.

Divergent questions
Questions that have no single correct answer.

KINDS OF QUESTIONS. Some educators have estimated the typical teacher asks between 30 and 120 questions an hour, or about 1,500,000 questions over a teaching career (Sadker & Sadker, 2006). What are these questions like? Many can be categorized in terms of Bloom's taxonomy in the cognitive domain. Table 14.7 offers examples of questions at the different taxonomic levels.

Another way to categorize questioning is in terms of **convergent questions** (only one right answer) or **divergent questions** (many possible answers). Questions about concrete facts are convergent: "Who ruled England in 1540?" "Who wrote the original *Peter Pan*?" Questions dealing with opinions or hypotheses are divergent: "In this story, which character is most like you and why?" "In 100 years, which of the past five presidents will be most admired and why?"

Table 14.7 Classroom Questions for the Cognitive Domain

Questions can be posed that encourage thinking at every level of Bloom's taxonomy in the cognitive domain. Of course, the thinking required depends on what has gone before in the discussion.

CATEGORY	TYPE OF THINKING EXPECTED	EXAMPLES
Remembering	Recalling or recognizing information as learned without really using or changing it	-List the capitals of.... -What are the six parts...? -Which strategy does the text say you should use here...?
Understanding	Demonstrating understanding of the materials without necessarily relating it to anything else	-Summarize in your own words.... -What does .... mean in this sentence? -Predict the next step....
Applying	Using information to solve a problem with a single correct answer	-Classify these plants.... -Calculate the area of.... -Select the best strategy for....
Analyzing	Breaking something down into parts; identifying reasons and motives; making inferences based on specific data; analyzing conclusions to see if supported by evidence	-What was the first breakthrough in...? The second? -Explain why Washington, D.C., was chosen.... -Which of the following are facts, and which are opinions...? -Based on your experiment, what is the chemical...?
Evaluating	Judging the merits of materials or methods as they might be applied in a particular situation, offering opinions, applying standards	-Rank the top 10 U.S. senators in terms of effectiveness in.... -Which painting do you believe to be better? Why? -Which study strategy is the best for you in...?
Creating	Creating something new; original thinking; original plan, proposal, design, or story	-What's a good name for...? -How could we combine those two ideas? -How could we raise money for...? -What would the United States be like if Germany had won...?

ASKING AUTHENTIC QUESTIONS. No matter what kinds of questions you ask, be sure that some are **authentic questions**, meaning you as the teacher don't already know the answer. Examples are "Have we seen this issue before?" "How is what we measure affected by the tools we use?" "In what we just read, how do we separate fact from opinion?" Authentic questions serve several functions (Kelly et al., 2018). They give some authority to students to shape the flow of discussion and connect the class topics to their own lives, so the students are more invested and engaged. Authentic questions also set expectations that everyone will get involved, not just the students who usually have the "right answers." Finally, authentic questions make you think critically and analyze. Authentic questions open the door for deep explanations. As we have seen before, there is strong evidence that questions requiring deep explanations help students improve academic performance and enhance authentic understanding. What is a deep explanation?

Authentic questions
Questions that the teacher does not have a predetermined answer for.

> Examples of deep explanations include those that inquire about causes and consequences of historical events, motivations of people involved in historical events, scientific evidence for particular theories, and logical justifications for the steps of a mathematical proof. Examples of the types of questions that prompt deep explanations are why, why-not, how, what-if, how does X compare to Y, and what is the evidence for X? These questions and explanations occur during classroom instruction, class discussion, and during independent study. (Pashler et al., 2007, p. 29)

FITTING THE QUESTIONS TO THE STUDENTS—AND WAITING. Different patterns seem to be better for certain types of students. The best pattern for younger students and for lower-ability students of all ages is simple questions that allow a high percentage of correct answers, ample encouragement, help when the student does not have the correct answer, and praise. For high-ability students, the successful pattern includes harder questions at both higher and lower levels and more critical feedback (Berliner, 1987; Good, 1988). Whatever their age or ability, however, all students should have some experience with thought-provoking, deep authentic questions and, if necessary, help in learning how to answer them.

To master critical thinking and problem-solving skills, students must have time to think about their answers. But classic research shows that teachers wait an average of only 1 second for students to answer (Rowe, 1974). When teachers learn to pose a question and then wait at least 3 to 5 seconds before calling on a student to answer, students tend to give longer answers; more students are likely to participate, ask questions, and volunteer appropriate answers; student comments involving analysis, synthesis, inference, and speculation tend to increase; and the students generally appear more confident in their answers (Sadker & Sadker, 2006).

This seems like a simple improvement in teaching, but 5 seconds of silence is not that easy to handle. It takes practice. You might try asking students to jot down ideas or even discuss the question with another student and formulate an answer together. This makes the wait more comfortable and gives students a chance to think. Of course, if it is clear that students are lost or don't understand the question, waiting longer will not help. When your question is met with blank stares, rephrase the question or ask if anyone can clarify it. However, some evidence shows that extending wait times does not affect learning in university classes, so with advanced high school students, you might conduct your own evaluation of wait time (Duell, 1994; Ingram & Elliott, 2016).

A word about selecting students to answer questions. If you call only on volunteers, then you may get the wrong idea about how well students understand the material. Also, the same people volunteer over and over again. Many expert teachers have some systematic way of making sure that they call on everyone: They pull names from a jar or check names off a list as each student speaks (Romano & Weinstein, 2019; Weinstein & Novodvorsky, 2015). Another possibility is to put each student's name on an index card and then shuffle the cards and go through the deck as you call on people. You can use the card to make notes about the quality of students' answers or any extra help they seem to need.

RESPONDING TO STUDENT ANSWERS. What do you do after the student answers? The most common response, occurring about 50% of the time in most classrooms, is simple acceptance—"Okay" or "Uh-huh" (Sadker & Sadker, 2006). But there are better reactions, depending on whether the student's answer is correct, partially correct, or wrong. If the answer is quick, firm, and correct, simply accept the answer or ask another question. If the answer is correct but hesitant, give the student feedback about why the answer is correct: "That's right, Chris, the Senate is part of the legislative branch of government because the Senate…." This allows you to explain the material again. If this student is unsure, others may be confused as well. If the answer is partially or completely wrong but the student has made an honest attempt, you should probe for more information, give clues, simplify the question, review the previous steps, or reteach the material. If the student's wrong answer is silly or careless, however, it is better simply to correct the answer and go on (Good, 1988; Rosenshine & Stevens, 1986).

Simply put, feedback is information about how the student's current performance relates to the learning goal—essential information for constructing understanding (Tan et al., 2020; van den Berg et al., 2014). John Hattie and Helen Timperley (2007) reviewed several decades of research on feedback and developed a model to guide teachers. The model proposes three feedback questions: "Where am I going?" "How am I going?" and "Where to next?" The first question is about goals and goal clarity. The second is about progress—movement toward goals. The third question is about moving forward to improve understandings when goals are not met yet or to build on attained goals. The Hattie and Timperley model also considers the focus of the feedback on four levels: *task, process, self-regulation*, and *self-feedback*. Here are some examples (p. 90):

> *Task Feedback:* "You need to include more about the Treaty of Versailles."
> *Process Feedback:* "This page may make more sense if you use the strategies we talked about earlier."
> *Self-Regulation Feedback:* "You already know the key features of the opening of an argument. Check to see whether you have incorporated them in your first paragraph."
> *Self-Feedback:* Less effective: "That's an intelligent response, well done." More effective: "You must have thought deeply about that response, well done."

Hattie and Timperley argue that feedback about *process* and *self-regulation* is the most powerful because it helps students move toward deep understanding, mastery, and self-direction in learning. Feedback about self (usually praise) is common in classes but is not effective unless the praise provides information about how effort, persistence, or self-regulation moved the student forward, as in "You are terrific—you stuck with this and revised again, and now this essay makes a powerful argument."

Finally, your feedback as a teacher can include *respectful inquiry* to explore the student's answer with them (Tan et al., 2020). This means that feedback is accompanied by asking questions to better understand the student's thinking, being open to follow where the answers lead, and attentive listening—giving students time to answer, looking at them directly, calling them by name. This two-way feedback interaction process models for students how to be more metacognitive—how to think about their own thinking. Sounds like good advice in general.

GROUP DISCUSSION AND QUALITY TALK. Classrooms "are the training grounds for citizenship, and discussions afford students opportunities not only to hear diverse viewpoints, but also to substantiate their claims with evidence" (Reisman, 2015, p. 1). During a **group discussion** a teacher may pose questions, listen to student answers, react, and probe for more information, but in a true group dialogue, the teacher does not have a dominant role. Students ask questions, answer each other's questions, and respond to each other's answers. These kinds of student-centered dialogues are relatively rare, however. One study of 64 middle schools found that only 1.6 minutes per 60-minute class were devoted to these

Group discussion
Conversation in which the teacher does not have the dominant role; students pose and answer their own questions.

discussions (Applebee et al., 2003). But no matter what kind of class discussions you have, remember the value of authentic questions that reveal students' thinking so you and other students can understand and build on their ideas. "Ambitious teachers engage students in collaborative negotiation of ideas motivated by authentic questions.... Such instruction requires teachers to be adept at using students' ideas as fuel to power classroom activity" (Kavanaugh et al., 2020).

Group discussions have many advantages. Motivation and engagement can be higher. Students learn to express themselves clearly, justify opinions, and tolerate different views. Group discussion also gives students a chance to ask for clarification and the opportunity to examine their own thinking, follow personal interests, and assume responsibility by taking leadership roles in the group. Discussions are also useful when students are trying to understand difficult concepts that go against common sense. By thinking together, challenging each other, and suggesting and evaluating possible explanations, students are more likely to reach a genuine understanding (Wu et al., 2013).

Of course, there are disadvantages. Class discussions are quite unpredictable and may easily digress into exchanges of ignorance. You may have to do a good deal of preparation to ensure that participants have enough background knowledge for the discussion. Some members of the group may have great difficulty participating and may become anxious if forced to speak. And large groups are often unwieldy. In many cases, a few students will dominate the discussion while the others daydream. At times teachers have to intervene to keep students focused on the goal, connected to the actual learning materials being discussed, and listening to each other (Arends, 2014; Freiberg & Driscoll, 2005; Reisman, 2015).

Are discussions effective learning tools? In a major review of research conducted from 1964 to 2003 on the value of discussing texts for *improving student comprehension*, Karen Murphy and her colleagues (2009) reached some surprising conclusions. They examined a wide range of discussion formats including Instructional Conversations, Junior Great Books Shared Inquiry, Questioning the Author, Literature Circles, Book Club, and Grand Conversation—to name just a few. They found that many of these approaches were very successful in increasing student talk, limiting teacher talk, and promoting students' literal interpretations of the texts they discussed. But getting students to talk more did not necessarily promote their critical thinking, reasoning, or argumentation skills. The researchers concluded, "Simply putting students into groups and encouraging them to talk is not enough to enhance comprehension and learning; it is but a step in the process" (p. 760). What happens *before, during*, and *after* the discussions are the keys.

Based on the findings from their research, Murphy and her colleagues developed an approach to discussions called **Quality Talk** to get the most benefit from discussing texts and readings (Murphy et al., 2016, 2018). "Quality Talk (QT) is a multifaceted approach toward classroom discussions designed to increase students' high-level comprehension by encouraging students to think and talk about, around, and with the text" (Murphy et al., 2018, p. 1120). Students meet in small groups (four to six members) to discuss the reading. The teacher selects the text and topic for discussion, but the students have control over taking turns in the discussion and over their own interpretations—the teacher is not looking for one right answer. Table 14.8 on the next page describes what happens before, during, and after the small-group discussions.

Quality Talk
An approach to classroom discussions designed to increase students' high-level comprehension by encouraging students to think and talk about, around, and with the text.

The *Guidelines: Productive Group Discussions* on the next page give some more ideas for facilitating a productive group discussion, whether they are whole class or small group.

Lessons for Teachers: Fitting Teaching to Your Goals

In the midst of all our discussions about methods, we have to keep in mind that the first questions should be: What should students learn? and What is worth knowing today? Then we can match methods to goals.

Table 14.8 Quality Talk in Small-Group Discussion: Before, During, and After

Just putting students in discussion groups does not guarantee learning. You have to prepare and have a plan before, during, and after.

TIME	TEACHER	STUDENTS
Before the small-group discussion	Provides mini lessons explicitly teaching how to ask and respond to authentic questions in critical and analytic ways and how to make evidence-based arguments and claims	-Read text -Complete activities in their journal to be sure they understand the key features (e.g., main idea) -Craft some authentic questions about the text
During the small-group discussion	-Facilitates discussion by encouraging students to search the text for arguments, assumptions, beliefs, themes, etc. -Models critical and analytic thinking -Challenges and prompts students to provide evidence, make personal connections -Gradually turns over more responsibility to the group as they improve	-Encourage each other to talk about personal connections to the text -Retrieve and revisit basic information from the text -Gradually take over control of turn-taking and the authority to make and challenge individual interpretations of the text
After the small-group discussion	-Gives feedback about the discussions, possible improvements in the process for next time, challenges any misconceptions -Checks for understanding using appropriate assessments and activities	-Complete post-discussion activities in their journals that require critical thinking and analysis -Set goals for the next group discussion

Source: Based on Murphy, P. K., Firetto, C. M., Wei, L., Li, M., & Croninger, R. M. V. (2016). What REALLY works: Optimizing classroom discussions to promote comprehension and critical-analytic thinking. *Policy Insights from the Behavioral and Brain Sciences, 3*, 27–35; Murphy, P. K., Greene, J. A., Firetto, C. M., Hendrick, B. D., Li, M., Montalbano, C., & Wei, L. (2018). Quality talk: Developing students' discourse to promote high-level comprehension. *American Educational Research Journal, 55*, 1113–1160.

GUIDELINES

Productive Group Discussions

Make sure students are prepared to discuss.

Examples

1. "Tomorrow we will discuss the first chapter in your novel. Bring a list with one thing that wasn't clear to you, one question that will make others think really deeply, and one connection to your life."
2. "Tonight write a one paragraph summary of Chapter 3 for tomorrow's discussion. Tomorrow before the discussion you will swap paragraphs and share feedback."

Invite shy children to participate.

Examples

1. "What's your opinion, Jazmin?" or "Does anyone have another opinion?"
2. Don't wait until there is a deadly silence to ask shy students to reply. Most people, even those who are confident, hate to break a silence.

Direct student comments and questions back to another student.

Examples

1. "That's an unusual idea, Kolter. Rosa, what do you think of Kolter's idea?"
2. "That's an important question, Mei. Alejandro, do you have any thoughts about how you'd answer that?"
3. Encourage students to look at and talk to one another rather than wait for your opinion.

Make sure that you understand what a student has said. If you are unsure, other students may be unsure as well.

Examples

1. Ask a second student to summarize what the first student said; then the first student can try again to explain if the summary is incorrect.
2. "Karen, I think you're saying.... Is that right, or have I misunderstood?"

Probe for more information, and ask students to elaborate and defend their positions.

Examples

1. "That's a strong statement. Do you have any evidence to back it up?"
2. "Did you consider any other alternatives?"
3. "Tell us how you reached that conclusion. What steps did you go through?"

Bring the discussion back to the subject.

Examples

1. "Let's see, we were discussing... and Jada made one suggestion. Does anyone have a different idea?"
2. "Before we continue, let me try to summarize what has happened thus far."

Give time for thought before asking for responses.

Example

1. "How would your life be different if television had never been invented? Jot down your ideas on paper, and we will share reactions in a minute." After a minute: "Hiromi, will you tell us what you wrote?"

When a student finishes speaking, look around the room to judge reactions.

Examples

1. If other students look puzzled, ask them to describe why they are confused.
2. If students are nodding assent, ask them to give an example of what was just said.

There is no one best way to teach. Different goals and student needs require different teaching methods at different times. Direct instruction often leads to better performance on achievement tests, whereas the open, informal methods such as discovery learning or inquiry approaches discussed in Cluster 10 are associated with better performance on tests of creativity, abstract thinking, and problem solving. In addition, the open methods are better for improving attitudes toward school and for stimulating curiosity, cooperation among students, and lower absence rates (Borich, 2011; Walberg, 1990). According to these conclusions, when the goals of teaching involve problem solving, creativity, understanding, and mastering processes, many approaches besides direct instruction should be effective. Every student may require direct, explicit teaching for some learning goals some of the time, but all students also need to experience more open, constructivist, student-centered teaching as well (Zhang et al., 2021).

Putting It All Together: Understanding by Design

We have covered quite a bit of territory here, from objectives to teaching strategies. Grant Wiggins and Jay McTighe's (2006) **Understanding by Design (UbD)** pulls it all together—expectations for high-level critical thinking, goals, evidence for learning, and teaching approaches. The focus is on deep understanding, which is characterized by the ability to (a) explain, (b) interpret, (c) apply, (d) have perspective, (e) empathize, and (f) have self-knowledge about a topic. The big idea behind UbD is *backward design*. Teachers first identify the important end results for students—the key understandings and big ideas that are the goals of instruction. To focus on understanding (not just fun activities or covering the text), teachers write *essential questions*—questions that go to the heart of the ideas and push thinking deeper: "What is the greatest problem of the democratic system?" "Who is entitled to own the airways?" "What makes a mathematical argument convincing?" Next the teacher identifies what evidence would demonstrate deep understanding (performance

Understanding by Design (UbD)

A system of lesson and unit planning that starts with key objectives for understandings and then moves backward to design assessments and learning activities.

tasks, quizzes, informal assessments?). Then and only then do the teachers design the learning plan—the instruction—they design backward *from* the end results *to* the teaching plan. This idea of going from clear goals to teaching plans is at the heart of every approach to using standards and specific targets in teaching.

Wiggins and McTighe provide a template to guide backward design planning. You can see many examples of these templates online. Do a web search for "Understanding by Design template." The process for completing a plan using backward design for a unit is shown in Figure 14.1. The teacher/designer moved backward from a core mathematics

Figure 14.1 Planning by Design

The planning process for a lesson on the Pythagorean Theorem the teacher/designer planned backward from the core standards.

Step 1—Designing the Goal

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
Common Core State Standards in Mathematics, Grade 8.G.B.7

Key Understandings

1. The area formed by the square on top of the hypotenuse of a right triangle is equal to the total area of the two squares formed on the tops of the other two sides.
2. There are multiple ways to prove the Pythagorean Theorem.

3.....

Essential Questions

1. What makes a mathematical argument of the Pythagorean Theorem convincing?

2. Are there any real world uses of the Pythagorean Theorem?

3.....

What Will the Student Know?

1. What is a hypotenuse of a right triangle?
2. What is the length of any side of a right triangle, given the two other sides?
3. .....

What Will the Student Be Able to Do?

1. Draw a graphic illustration that demonstrates the validity of the Pythagorean Theorem.
2. ……

Step 2—Designing the Assessment

Authentic/Real-World Assessments

1. Can you calculate the height of a flagpole based on its shadow—how?
2. You have an old media cabinet with an opening that is 34" by 34". You want a new flat screen TV that is at least a 42" diagonal. Assume the ratio of a new TV height to width is 3/5. Will it fit? Why?
3. Given that the distance between successive bases in baseball is 90 feet, what is the distance a throw has to travel from third base and first base?
4.....

Traditional Assessments

1. Questions on homework
2. Self-questions developed based on chapter, along with answers and justifications.
3. Unit test
4.....

Step 3—Designing the Learning

1. In groups, investigate the area of squares, triangles, and rectangles around the classroom—compare your group's areas with the areas calculated by other groups for the same objects.
2. Using cardboard pieces, scissors, a ruler, and pencil, prove the Pythagorean Theorem.
3. Modules 6 & 7 in text

standard by identifying key understandings and essential questions based on the standard, then planning assessments including traditional tests as well as textbook assignments and performance tasks that include real-life applications, and finally creating learning experiences that will support understanding. Can you see how many levels of Bloom's taxonomy are represented here?

So far, we have talked about approaches to teaching—targets, strategies, and learning plans. But in today's diverse classrooms, one size does not fit all. Teachers have to fit their instruction to the needs and abilities of their students—they have to differentiate instruction.

Differentiated Instruction

The idea of **differentiated instruction**—adapting teaching to the abilities and needs of each learner—is an ancient one. To prove it, Lyn Corno (2008, p. 161) quotes these words of Quintilian from the fifth century B.C.:

> Some students are slack and need to be encouraged; others work better when given a freer rein. Some respond best when there is some threat or fear; others are paralyzed by it. Some apply themselves to the task over time, and learn best; others learn best by concentration and focus in a single burst of energy.

Obviously, Quintilian appreciated the need for fitting instruction to the student. With the increasingly diverse students in today's classrooms, differentiating instruction is more important than ever. Kelly Puzio and his colleagues note that teachers who successfully differentiate "focus on clear conceptual goals; consider a wide variety of assessment data; carefully plan lessons and units considering students' needs, preferences, and strengths; and flexibly adapt the curriculum and instruction to suit his or her students" (Puzio et al., 2020, p. 460). Reviewing 20 years of work on differentiation in literacy classes, these researchers concluded that when teachers are supported in differentiating, their students have significantly higher literacy achievement—writing is especially improved.

Differentiated instruction
A flexible approach to teaching that matches content, process, and product based on student differences in readiness, interests, and learning needs. Takes into account students' abilities, prior knowledge, and challenges so that instruction matches not only the subject being taught but also students' needs.

Teachers can plan for student differences in advance by designing different levels of support and scaffolding for the tasks, texts, and tools that students will encounter—called *designed differentiation*. But even with good planning, some differentiation happens on the fly to adapt during teaching—called *interactional differentiation*. There are three targets for designed differentiation, content, process, and product. Here are a few examples (Puzio et al., 2020):

Content: Different types of texts (books, films, maps, graphic novels); modified texts (the teacher pre-highlights key passages); more or less difficult material

Process: Task differentiation (write a one-paragraph summary versus a one-page critique); different tools (text to speech software, dictation, sentence starters, concept mapping software)

Product: Different compositions (write a new ending to the story, do a character analysis, design a web page); different performances (present a tableau, retell the story with added imagery)

Many approaches to differentiation rely on appropriate groupings.

Within-Class and Flexible Grouping

It is not unusual to have 3- to 5-year ability differences in any given classroom (Castle et al., 2005). But even if you decided to simply forge ahead (against Quintilian's advice) and teach the same material in the same way to your entire class, you would not be alone. Differences in students' prior knowledge are a major challenge for teachers, especially in subjects that build on previous knowledge and skills such as math and science. One answer has been ability grouping, but that also poses a number of problems.

Connect and Extend to PRAXIS II®

The Teacher's Role in Student-Centered Instruction (II, A3)

The teacher's role in student-centered instruction is significantly different from that in teacher-centered instruction.

Within-class ability grouping
System of grouping in which students in a class are divided into two or three groups based on ability in an attempt to accommodate student differences.

THE PROBLEMS WITH ABILITY GROUPING. Students in many classes and schools are grouped by ability, even though there is no definitive evidence that this **within-class ability grouping** is superior to other approaches (Becker et al., 2014). In a random sample of primary grade teachers in the United States, 63% reported using within-class ability groups for reading. Students in lower-ability groups were less likely to be asked critical comprehension questions and were given fewer opportunities to make choices about what to read (Chorzempa & Graham, 2006). For schools with students from lower SES families, grouping often means that these students are segregated into lower-ability tracks. According to Paul George (2005):

> In my 3 decades of experience with this issue, when homogenous grouping is the primary strategy for organizing students in schools with significant racial and ethnic diversity in the population, the result is almost always deep, and often starkly obvious, division of students on the basis of race, ethnicity, and social class. (p. 187)

Thoughtfully constructed and well-taught ability groups in math and reading can be effective, but the point of any grouping strategy should be to provide appropriate challenge and support—that is, to reach children within their zone of proximal development, that area where students can learn and develop (Vygotsky, 1997). In other words, to be effective, different groups require appropriate adjustments in *content*, *process*, and *product* for the groups (Kulik & Kulik, 1997). Flexible grouping is one possible answer.

Flexible grouping
Grouping and regrouping students based on learning needs.

FLEXIBLE GROUPING. In **flexible grouping**, students are grouped and regrouped based on their learning needs. Assessment is continuous so that students are always working within their zone of proximal development. Arrangements might include small groups, partners, individuals, and even the whole class—depending on which grouping best supports each student's learning of the particular academic content. Flexible grouping approaches include high-level instruction and high expectations for all students, regardless of their group placement (Corno, 2008). One 5-year longitudinal study of flexible grouping in a high-needs urban elementary school found 10% to 57% increases in students who reached mastery level, depending on the subject area and grade level. Teachers received training and support in the assessment, grouping, and teaching strategies needed, and by the end of the study, 95% of the teachers were using flexible grouping. The teachers in the study believed that some of the gains came because students were more focused on learning and more confident (Castle et al., 2005). Do a web search for "flexible grouping" to find many ideas and examples.

As we have seen repeatedly throughout this text, working at a challenging level but one you can master with effort and support is more likely to encourage learning and motivation. If you ever decide to use flexible grouping in your class, the *Guidelines: Using Flexible Grouping* should make the approach more effective (Arends, 2014; Good & Brophy, 2008).

GUIDELINES

Using Flexible Grouping

Form and re-form groups based on accurate diagnosis of students' current performance in the subject being taught.

Examples

1. Use scores on the most recent reading assessments to establish reading groups and rely on current math performance to form math groups.
2. Assess continuously. Change group placement frequently when students' achievement changes.

Make sure different groups get appropriately different instruction, not just the same material. Make sure teachers, methods, and pace are adjusted to fit the needs of the group.

Examples

1. Vary more than pace; fit teaching to students' interests and knowledge.
2. Assign all groups research reports, but make some written, and others oral or PowerPoint® presentations.
3. Organize and teach groups so that low-achieving students get appropriate extra instruction—not just the same material again. Make lower-achieving groups smaller so students get extra attention.
4. Make sure all work is meaningful and respectful—no worksheets for lower-ability groups while the higher-ability groups do experiments and projects.
5. Try alternatives. For example, DeWayne Mason and Tom Good (1993) found that supplementing whole-class instruction in math with remediation and enrichment for students when they needed it worked better than dividing the class into two ability groups and teaching these groups separately.

Discourage comparisons between groups, and encourage students to develop a whole-class spirit.

Examples

1. Don't seat groups together outside the context of their reading or math group.
2. Avoid naming ability groups—save the names for mixed-ability or whole-class teams.

Group by ability for one or at the most, two subjects.

Examples

1. Make sure that many lessons and projects mix members from the groups.
2. Experiment with learning strategies that stress cooperation (described in Cluster 10).
3. Keep the number of groups small (two or three at most) so that you can provide as much direct teaching as possible. Leaving students alone for too long leads to less learning.

Stop & Think When you think about teaching in an inclusive classroom, what are your concerns? Do you have enough training? Will you get the support you need from school administrators or specialists? Will working with the students with disabilities take time away from your other responsibilities?

Differentiated Instruction in Inclusive Classrooms

The *Stop & Think* questions are common ones, and sometimes such concerns are justified. But effective teaching for students with disabilities, and all students for that matter, does not require a unique set of skills. It is a combination of good teaching practices and sensitivity to all your students. All your students need to learn the academic material, and they need to be full participants in the day-to-day life of the classroom. Assistive technologies can help.

ASSISTIVE TECHNOLOGY. The Individuals with Disabilities Education Act (IDEA) requires that all students eligible for special education services be considered for assistive technology. **Assistive technology** is any product, piece of equipment, or system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities (Goldman et al., 2006). For students who require small steps and many repetitions to learn a new concept, computers are the perfect patient tutors, repeating steps and lessons as many times as necessary. A well-designed computer instructional program is engaging and interactive—two important qualities for students who have problems paying attention or a history of

Assistive technology
Devices, systems, and services that support and improve the capabilities of individuals with disabilities.

Figure 14.2 Resources for Assistive Technologies

Here are a few websites to start your search.

AT RESOURCES

For information about types and training in AT, go these websites:

- Assistive Technology Industry Association: **https://www.atia.org/home/at-resources/what-is-at/**
- Edutopia (**http://www.edutopia.org**; click "topics"; click "all topics"; click "Assistive Technology")
- International Society for Technology in Education (**http://www.ISTE.org**
- The Iris Center (**https://Iris.peabody.vanderbilt.edu/module/at**)
- Microsoft Company (**http://www.microsoft.com**; search "assistive technology")
- National Center on Accessible Educational Materials (**http://aem.cast.org**)
- Types of assistive technologies: **https://www.nichd.nih.gov/health/topics/rehabtech/conditioninfo/device**

Source: Based on Friend, M. & Bursuck, W. D. (2019). *Including students with special needs: A practical guide for classroom teachers* (8th ed.).Hoboken, NJ: Pearson, p. 170.

failure that has eroded motivation. For example, a math or spelling program might use images, sounds, and gamelike features to maintain the attention of a student with an attention-deficit disorder. Interactive digital media programs teach hearing people how to use sign language. Many programs do not involve sound, so students with hearing impairments can get the full benefit from the lessons. Students who have trouble reading can use programs that will "speak" a word for them if they touch the unknown word. With this immediate access to help, these students are much more likely to get the reading practice they need to prevent falling further and further behind. Other devices actually convert printed pages and typed texts to spoken words for students who are blind or others who benefit from hearing information. For the student with a learning disability whose writing is not legible, word processors produce perfect penmanship so the ideas can finally get on paper. Once the ideas are recorded, students can reorganize and improve their writing without the agony of rewriting by hand (Hallahan et al., 2019). Figure 14.2 is a list of resources for assistive technology. Things are changing so fast, see if your school has a specialist to provide support about assistive technologies that might help your students.

Reaching Every Student: Differentiation with Universal Design for Learning

With these tremendous advances in technology have come new barriers, however. Many computers have graphic interfaces. Manipulating the programs requires precise mouse or track pad movements, as you may remember when you first learned to point and click. These maneuvers are often difficult for students with motor problems or visual impairments. And the information available on the Internet often is unusable for students with visual problems. Researchers are working on the problem—trying to devise ways for people to access the information nonvisually.

Universal design

Considering the needs of all users in the design of new tools, learning programs, or websites.

Universal design for learning (UDL)

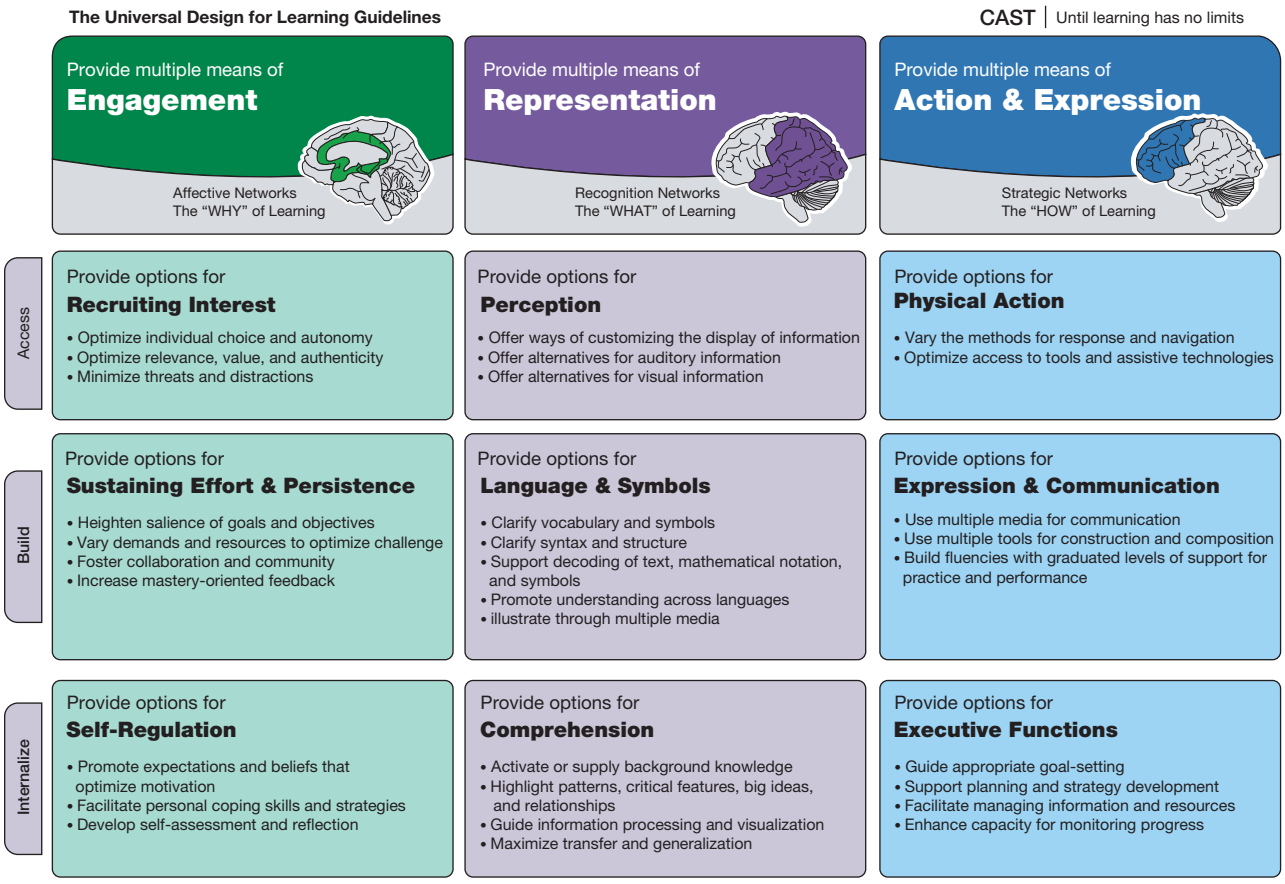
Strategies and structures to make learning accessible to as many students as possible in inclusive settings.

In architecture, the concept of **universal design** addresses these concerns by considering the needs of all users in the design of new buildings, tools, learning programs, websites, and so on. The same principle of design for everyone in education is called **universal design for learning (UDL)**. The principles of UDL are to provide multiple ways to engage with the learning process, multiple ways to represent or present the learning materials, and multiple ways for students to act and express their understanding. The Center for Applied Special Technology (CAST) has been the leader in developing the field of universal design for learning. Their *Guidelines for Universal Design for Learning* are used around the world. Table 14.9 is a summary of those guidelines. You can find an interactive version at https://udlguidelines.cast.org (CAST, 2018; Hallahan et al., 2019; Pisha & Coyne, 2001).

You can see how these guidelines pull together many of the topics in this book.

- Motivation and the "Why" of learning, including interest, effort, autonomy support, mastery goals, and self-regulation (Clusters 11 and 12).
- Representations and "What" is learning, including verbal and visual representations, languages, symbols, big ideas, patterns (Clusters 6, 8, and 9).
- Expressing learning and the "How" of learning, including different ways of responding, multiple tools, goal setting, learning strategies, monitoring and managing learning (Clusters 5, 7, 13, and 14).

Table 14.9 Guidelines for Universal Design for Learning (UDL)



Source: CAST (2018). *Universal Design for Learning Guidelines version 2.2*. Retrieved from http://udlguidelines.cast.org.

Module 44 Summary

Teaching Approaches (pp. 624–639)

How should teachers use direct instruction and homework? Direct instruction is appropriate for teaching basic skills and explicit knowledge. It includes the teaching functions of review/overview, presentation, guided practice, feedback and correctives (with reteaching if necessary), independent practice, and periodic reviews. The younger or less able the students, the shorter the presentation should be, with more cycles of practice and feedback. The "10-minute rule" for homework means 10 minutes of homework per night starting in the first grade and increasing by 10 minutes each grade, so a 12th-grader would be assigned about 120 minutes.

Distinguish between convergent and divergent questions and describe deep questions. Convergent questions have only one right answer. Divergent questions have many possible answers. Deep questions (such as *why, why not, how, what if, how does X compare to Y*, and *what is the evidence for?*) require thoughtful and well-reasoned explanations—students have to think for themselves. The best pattern for younger students and for lower-ability students of all ages is simple questions that allow a high percentage of correct answers, ample encouragement, help when the student does not have the correct answer, and praise. For high-ability students, the successful pattern includes harder questions at both higher and lower levels and more critical feedback. Whatever their age or ability, all students should have some experience with deep, thought-provoking questions and, if necessary, help in learning how to answer them.

How can wait time affect student learning? When teachers pose a question and then learn to wait at least 3 to 5 seconds before calling on a student to answer, students tend to give longer answers; more students are likely to participate, ask questions, and volunteer appropriate answers; student comments involving analysis, synthesis, inference, and speculation tend to increase; and the students generally appear more confident in their answers.

What are the uses and disadvantages of group discussion? Group discussion helps students participate directly, express themselves clearly, justify opinions, and tolerate different views. Group discussion also gives students a chance to ask for clarification, examine their own thinking, follow personal interests, and assume responsibility by taking leadership roles in the group. So group discussions help students evaluate ideas and synthesize personal viewpoints. However, discussions are quite unpredictable and may easily digress into exchanges of ignorance. Quality Talk is one way to increase students' high-level comprehension of texts and support personal engagement with the text. To use this approach, teachers have to plan carefully for what will happen before, during, and after the small-group discussions at the heart of the strategy.

How can you match teaching to your goals? Different goals and student needs require different teaching methods. Direct instruction often leads to better performance on achievement tests, but the open, informal methods such as discovery learning or inquiry approaches are associated with better performance on tests of creativity, abstract thinking, and problem solving. In addition, the open methods are better for improving attitudes toward school and for stimulating curiosity, cooperation among students, and lower absence rates.

How can you use Understanding by Design to plan quality instruction? The focus of UbD is on deep understanding, which is characterized by the ability to (a) explain, (b) interpret, (c) apply, (d) have perspective, (e) empathize, and (f) have self-knowledge about a topic. The big idea behind UbD is backward design. Teachers first identify the important end results for students—the key understandings and big ideas that are the goals of instruction. To focus on understanding (not just fun activities or covering the text), teachers write essential questions—questions that go to the heart of the ideas and push thinking deeper. The UbD template guides planning based on these considerations.

Differentiated Instruction (pp. 639–643)

What characterizes differentiated instruction? A flexible approach to teaching that matches content, process, and product based on student differences in readiness, interests, and learning needs. Takes into account students' abilities, prior knowledge, and challenges so that instruction matches not only the subject being taught but also students' needs.

What are the problems with ability grouping? Academic ability groupings can have disadvantages and advantages for students and teachers. Students in higher-ability groups may benefit, but students in lower-ability groups are less likely to be asked critical comprehension questions and are given fewer opportunities to make choices about readings and assignments. For schools with students from lower SES families, grouping often means that these students are segregated even in their own classes, so ability grouping can create segregation within diverse schools.

What are the alternatives available for grouping in classes, including flexible grouping? In flexible grouping, students are grouped and regrouped based on their learning needs. Assessment is continuous so that students are always working within their zone of proximal development. Arrangements might include small groups, partners, individuals, and even the whole class—depending on which grouping best supports each student's learning of the particular academic content. Within-class ability grouping, if handled sensitively and flexibly, can have positive effects, but alternatives such as cooperative learning may be better.

What characterizes effective teaching for students with disabilities? Effective teaching for students with disabilities does not require a unique set of skills. It is a combination of good teaching practices and sensitivity to all students. Students with disabilities need to learn the academic material, and they need to be full participants in the day-to-day life of the classroom.

To accomplish the first goal, students with learning disabilities benefit from using extended practice distributed over days and weeks and from advanced organizers such as focusing students on what they already know or stating clear learning targets. Universal design for learning (UDL) is a possibility for accomplishing the second goal of fully including students in the day-to-day life of the classroom. The principles of UDL are to provide multiple ways to engage with the learning process, multiple ways to represent or present the learning materials, and multiple ways for students to act and express their understanding.

Cluster 14 Review

Key Terms

Ambitious teaching
Active teaching
Affective domain
Assistive technology
Authentic questions
Basic skills
Cognitive domain
Constructivist approach
Convergent questions
Differentiated instruction
Direct instruction/Explicit teaching
Divergent questions
Expert teachers
Flexible grouping
Group discussion
Lesson Study
Pedagogical content knowledge (PCK)
Psychomotor domain
Pygmalion effect
Quality Talk
Reflective
Scripted cooperation
Self-fulfilling prophecy
Sustaining expectation effect
Taxonomy
Understanding by Design (UbD)
Universal design
Universal design for learning (UDL)
Webb's Depth of Knowledge (DOK)
Within-class ability grouping

Connect and Extend to Licensure

Multiple-Choice Questions

1. Direct instruction is best used when teachers do which one of the following?

A. Teach basic skills

B. Have their students explore numerous pathways to solve a mathematics problem

C. Encourage their students to refine their creativity in art

D. Assign critical thinking exercises

2. Homework has long been a staple of education. For students to gain the most from their homework experience, ALL BUT which one of the following suggestions should be followed?

A. Establish that students understand the assignment.

B. Hold students accountable for completing the work correctly.

C. Check students' work and allow for corrections and revisions.

D. Require a parent signature to ensure collaboration with family.

3. Ellen Baker knew that her new job in a middle school would require that she understand differentiated instruction. Using this strategy, her students would be more apt to progress and master the concepts they needed to succeed throughout their school years. One of the techniques she decided to use involved grouping students by their learning needs. She would group students who had scored poorly on their fractions tests with similar students to remediate and develop that skill. She likened this type of differentiated instruction to having students continually work in their zone of proximal development. The type of strategy Ellen Baker wants to use is referred to as which one of the following?

A. Flexible grouping

B. Jigsaw

C. Collaborative group work

D. Peer tutoring

4. Teachers sometimes make determinations about their students' abilities based on little evidence. When teachers expect their students will not do well, their words and actions can make that expectation come true regardless of the validity. This effect is referred to as which one of the following?
   - **A.** Self-fulfilling prophecy
   - **B.** The zone of proximal development
   - **C.** Professional license
   - **D.** Supportive withdrawal

Constructed-Response Questions

Case

Although Casey Yost had done well in her college classes, she was having a difficult time with her student teaching. Her mentor teacher continually scolded her for not correctly writing her objectives and rushing through lessons. Casey did not understand how she could both make her lessons clear and manage to cover the material necessary for the students' upcoming standardized tests. "Casey, if your students don't understand the material, it won't make any difference if you cover the material or not. Let's review one of your objectives for the upcoming lesson. 'Students will understand fractions.' This objective is too general. How can you measure if your students 'understand'? You need to select words that correspond to specific actions that you can observe or measure. Let's try to develop a few objectives that are more specific."

5. In what ways can Casey Yost avoid writing objectives that are too general?
6. List several strategies that Casey can employ during instruction to teach her students more effectively.

What Would They Do?

Teachers' Casebook: Reaching and Teaching Every Student

At the beginning of this cluster, we asked you to think critically about how to deal with the wide range of reading levels, family incomes, learning strengths, and learning challenges in your classroom. Now, as you consider these expert teachers' responses to the case, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

Amy Pochodylo • 9th–12th-Grade Science Teacher
Buckeye Valley High School, Delaware, OH

When differentiating instruction, I always start by thinking about the learning targets being addressed and the ways that students could show mastery of those targets. Whenever possible, I like to also differentiate assessment, so that it is accessible in a variety of ways to students as well. A great framework that I have found for differentiation is the layered classroom (https://www.help4teachers.com/how.htm).

To help differentiate for different reading levels, I've used interactive reading guides (where students work with a partner and discuss the reading in a structured activity as they go), leveled texts (great technology tools like Newsela help with this), and offered independent reading guides to help students determine what information they should be looking for in a text. I also try to provide access to content in multiple formats, such as by offering a reading, a video, and an opportunity for small-group instruction whenever possible.

I also differentiate the formative assessment opportunities. I build in independent work days where students can revisit topics and self-assess their knowledge, choosing to complete options such as edPuzzle video questions, online lab simulations, or other activities.

In order to make sure that students are meeting learning goals, I also build in whole-class activities, such as hands-on labs, so that I can assess student knowledge and address common misconceptions with the whole class. Periodic whole-class activities give us a common experience to draw on as well when it is time for assessment.

When it is time for a summative assessment, I often include choice for students in open-ended questions, so they can decide which questions to answer to best demonstrate their knowledge. It can also be useful to allow them to answer in a variety of ways, including written responses, typed responses, or verbal responses (technology tools like Flipgrid make it easy for students to record their responses).

Anne Liners • 9th–12th-Grade English/Language Arts Student Teacher
South High School, Minneapolis, MN

A constructivist approach to teaching is incredibly helpful for accommodating diverse learners. Students who are able to make their own meaning from the course content will naturally bring the material into their own Zone of Proximal Development. For example, assigning a research inquiry project might mean that some students find peer-reviewed sources from academic databases while others struggle through articles written at a fourth-grade reading level. As long as both of those students—and everyone in between—are challenging themselves, practicing research skills along with reading skills,

and learning new content, then everybody wins. Assessments should look for this progress.

Most importantly, teachers must be intentional not to create a hierarchy within the diversity. Even in my English classes, I can't assume that better reader means smarter kid. A student with a learning disability that obstructs their math abilities might be a brilliant saxophone player or babysitter or chef. And students who struggle with English are often made to feel 'dumb' next to their native-speaker classmates, but they have another whole language worth of knowledge. To accommodate all students, a teacher must draw out these strengths. A diverse classroom offers the opportunity for an exchange of the wide range of knowledge that all of these kids bring to school—not just the high achieving ones. Students in diverse schools don't just learn the content, they learn the languages, cultures, struggles, and skills of their classmates. Planning opportunities for students to guide how and what they learn will help teachers take advantage of the diverse brilliance of their classes.

Lisa White • 2nd-/3rd-Grade Combined and 3rd-/4th-Grade Combined Elementary Teacher

Moody Elementary School, Port Moody, British Columbia, Canada

I very highly personalize instruction to meet the diverse needs of students. Primarily, I build a classroom environment purposefully around the practices known to promote self-regulated learning (SRL). In addition, I attend to practices that support social-emotional learning (SEL), executive functioning, and self-determination. I am proud that this allows for students of all abilities and needs to be part of our rich and respectful learning community.

A foundation of SEL is essential in creating a calm and caring learning environment. My students and I build a common language around SEL, executive function, and self-determination knowledge, skills, and concepts, which are reviewed regularly and as needed throughout the year.

I use opportunities I have to coach students through the curriculum, or a productive struggle, to teach them how to learn in various contexts.

I focus on teaching the skills, strategies, and mindsets that we all need in order to be successful humans. Students are given control over challenges as they choose what and how they will learn, where and when they will learn it, across the curriculum with the guidelines we build together. We work as a community and as individuals. Students are encouraged to reflect on their own successes and struggles, then receive feedback and support from their peers. Students have learned to coach each other through struggles and celebrate one another's successes.

Technology has become an essential tool in our classroom. Students use technology to advance and reflect on their personalized learning, communicate with their classmates and families, and assess and evaluate their learning. All students have access to the adaptive learning abilities of this technology and use this to control the challenge of an assignment.

Assessment occurs on a daily basis. I am constantly observing students to understand them as learners. We run through each stage of an informal inquiry process to inform private discussions I have with students to assess their learning. I collect student work samples, give exit tasks, play games, and perform various other methods of formative assessment to share with students in order to prompt them to talk about what and how they have learned, and how far they have come in their learning. Together we use these discussions to revise or create new learning goals and develop and act upon hunches and ideas about supports they need to achieve their goals. I find it very rare that students empowered with their own learning need coaching to accurately assess their work. Often, they have much deeper insights into their learning than I ever could.

Melissa Roy • 10th-Grade Reading/English Teacher

Lake Brantley High School, Altamonte Springs, FL

As a constructivist, I believe education should be something more akin to what Yeats described as "lighting a fire" rather than "filling a pail." In my English class I adopted the reading and writing workshop approach in order to ignite students' love for both and meet them at their level of need. Students love it! They mostly read self-selected texts based on their own interests and abilities and demonstrate mastery of state standards in a variety of ways, including both formal and informal assessments such as book talks or research projects on a topic of interest related to the text.

Likewise, students are given choice of mode and medium of writing. I use direct instruction to teach a series of mini lessons on writing techniques, which students are expected to implement as they write. Every piece of writing will not be assessed; instead, students are encouraged to self-assess pieces (with guidance from me and peers) and select their best work for publication and grading. Students are required to write a certain number of finished pieces and read a certain number of texts by the end of the semester according to goals we set together, with each student's goals being unique to her or his needs. And though goals are individual, I understand that learning is an inherently social process, so I build in daily opportunities for students to collaboratively problem solve and give and receive feedback on their work as often as needed.

In our school we are fortunate to have plentiful technology available to support differentiation and we utilize it daily! Using our online learning management system, I design modules that include opportunities for enrichment and remediation, and also use this platform to facilitate online discussions and collaborations between students.

Tiffinay Al-Lateef • Kindergarten–1st-Grade Teacher
KIPP Columbus Primary, Columbus, OH

To meet the diverse needs of my students, I would differentiate instruction in my classroom. To address the wide range of reading I would provide skill appropriate, culturally relevant texts. To build and bridge gaps with basic reading tools, I would pre-teach and build on vocabulary as much as possible for students.

Yes, different philosophies of teaching would have a direct effect on what and how information is being taught to students.

While trying to reach every student in my classroom, I would build and focus on individualized assessments for each of my students instead of using mostly standardized testing. Prior to testing I would research the interest of my students, to see what is important to them. This way I would incorporate relevant interest of the students in assessments and my lessons.

Technology is present now more than ever before. I would use smart white boards, Chromebook, iPads music, and cell phones. Due to the current pandemic, technologies such as Zoom and Google Classroom help me to reach all my students virtually.

Lou De Lauro • 5th-Grade Language Arts Teacher
John P. Faber School, Dunellen, NJ

In your hometown you probably know a lot of people. To be successful you are going to have to use the town to help you. If you plan properly, you should be able to secure one guest a week for the entire school year. The kids will love meeting new people each week and reading with them. But you need more than a guest a week to visit your classroom. So ask the businesses in town. Maybe a business can run a fundraiser so you can purchase alternative texts for your students. Maybe the local library can introduce you to their biggest donor who might donate texts to you. Maybe you can apply for a grant with the local educational foundation to get new materials.

But you need more help. You are a teacher; you were probably a strong student who connected with your former teachers. Visit any teachers that are still teaching, and get their advice on what to do. What has worked in the past may work well now, too.

Devote many hours after school to your students. Small-group instruction will help these kids. Get the two students who are practically ready for college small stipends donated by a local business so they stay after school and help you with your challenging students. I think that if you fully take advantage of your home court, this is one situation in which you can easily prevail.

Marie Hoffman Hurt • 8th-Grade Foreign Language (German and French) Teacher
Pickerington Local Schools, Pickerington, OH

To start, I would encourage a teacher to look beyond the general classifications of "white, working, middle class, and English speaking." Even in a class full of students who fit this demographic, there is an array of individuals. Each student learns differently and has different interests. A good teacher will recognize this and challenge students as people, not as groups. Do your best to layer as much as you can throughout your lessons. Give students choices. Use what resources you have—in this case particularly resources for students who are learning English as a second language. Even praising students' individual characteristics and accomplishments outside the classroom sets the tone. Finally, keep in mind that you are only one person and can only give your best. Don't overwork yourself and burn out—you are no good to your students or your family if you are wiped out.

M. Denise Lutz • High School Technology Coordinator
Grandview Heights High School, Columbus, OH

Studies have shown that student success is directly related to teacher effectiveness. In today's diverse classrooms a teacher must develop effective classroom pedagogy that incorporates effective instructional strategies, uses effective classroom management strategies, and designs effective classroom curriculum to meet the needs of all learners. It is necessary to communicate learning goals for all students, track individual progress, and celebrate successes. Under the guidance of the teacher, students should learn to work collaboratively in small groups and as a cohesive class encouraging and helping one another to be successful. A teacher who establishes and maintains classroom rules and procedures while acknowledging students who do and do not follow these rules and procedures fosters this kind of environment. Consistency, trust, and authenticity will help to advance the development of effective relationships between the teacher, the home, and among class members. Effective classroom curriculum always begins with the end in mind. The teacher should have a clear picture of what mastery of content would look like for each of his or her students. Understanding the big idea and defining essential questions will guide the collection of activities and lessons that will move each student in the direction of success. The direction of success will remain the same for all students, but lessons and activities may present different paths for individuals to traverse. Today's teacher must work from day one to get to know each individual and to establish a culture of collaboration among the group.

Patricia A. Smith • High School Math Teacher
Earl Warren High School, San Antonio, TX

Because this new teacher is a product of the same school system, it will be imperative to begin classroom instruction with absolutely no preconceived opinions toward any particular student. Likewise, a diverse population requires the teacher to resolve student situations discreetly and judiciously, and not publicly. The initial goals of the teacher would be to facilitate student work in a cooperative manner and engender teacher trust. Planning and organizing icebreaker exercises the first few days of the school year could prove extremely profitable.

With a wide range of reading levels, small groups would work to the teacher's advantage. I would not suggest grouping students according to reading level at all times, but would opt to appoint a recognized student leader to orchestrate daily oral recitations. Moreover, I would select reading materials suited to all students and keep the assignments brief to avoid overwhelming struggling readers. The student leader could also design questions to gauge comprehension and give the group a follow-up spelling test. Initially, the spelling test would be composed of 5 to 10 simple words that students could either print or write. Subsequently, as the students gain confidence and experience success, the readings could be assigned as homework and the students would be required to write a short paragraph answering a reading comprehension question.

If the teacher remains well organized, the instructional time allotted for small-group interaction should not extend over 15 minutes in a single class period. Thus, the teacher would not forfeit traditional grammar lessons for the entire class but would still provide limited individualized instruction. I would also supplement SAT reading and English practice for all college-bound students.

Cluster 15

Classroom Assessment, Grading, and Standardized Testing



Nino B., Age 10, Georgia ICAF.org

Teachers' Casebook:

Giving Meaningful Grades

What Would You Do?

Your school requires that you give letter grades to your class. You can use any method you want, as long as an A, B, C, D, or F appears for each of the subject areas on every student's report card, every grading period. Some teachers are using worksheets, quizzes, homework, and tests. Others are assigning group work and portfolios. A few teachers are individualizing standards by grading on progress and effort more than on final achievement. Some are trying contract approaches and experimenting with longer-term projects, while others are relying almost completely on daily class work. Two teachers who use group work are considering giving credit toward grades for being a "good group member" or competitive bonus points for the top-scoring group. Others are planning to use improvement points for class rewards, but not for grades. Your only experience with grading was using written comments and a mastery approach that rated the students as making satisfactory or unsatisfactory progress toward particular learning targets. You want a system that is reliable, fair, and manageable but also

encourages learning, not just performance. And you want a system that gives the students feedback they can use to prepare for the state proficiency tests.

Critical Thinking

- What would you choose as your major graded assignments and projects?
- Would you include credit for behaviors such as group participation or effort?
- How would you put all the elements together to determine a grade for every student for every marking period?
- How would you justify your system to the principal and to the students' families, especially when the teachers in your school are using so many different criteria?
- What do you think of the wide range of criteria being used by different teachers—is this fair to students?
- How will these issues affect the grade levels you will teach?



Overview and Objectives

As you read this cluster, you will examine assessment, testing, and grading, focusing not only on the effects they are likely to have on students but also on practical ways to develop better methods for testing and grading. Teachers who are experts in assessment have developed ways to assign, collect, evaluate, organize, and return student work and then use the results of assessments to plan future instruction. They make it look easy, but as you learned in Cluster 13, routines have to be taught, explained, and practiced to work smoothly. The same holds for assessment and grading routines (Fives & Barnes, 2020). If you are feeling a bit challenged and unsure of your skills in these different areas, you are not alone. Even experienced teachers feel inadequately prepared for this important task (Ayalon & Wilkie, 2020). The goal of this cluster is to get you ready!

I (Anita in this cluster) begin with a consideration of the basic concepts in assessment, including reliability, validity, and absence of bias. Next, we examine the many types of tests teachers prepare each year and approaches to assessment that don't rely on traditional testing. Then, we explore the effects grades are likely to have on students and the very important topic of communicating with students and families. How will you justify the grades you give? Finally, because standardized tests are so important today, we spend some time looking at testing, the meaning of test scores, alternatives to traditional testing, and the role of tests in teacher evaluation.

By the time you have completed this cluster, you should be able to:

15.1 Describe the basics of assessment, including types of assessments (standardized tests, classroom assessments, and measurements as well as formative, interim, and summative assessments), and explain how reliability, validity, and absence of bias are used to understand and judge assessments.

15.2 Describe two kinds of test interpretations (norm-referenced and criterion-referenced), how to use selected-response and constructed-response/essay testing appropriately in teaching, and the advantages as well as criticisms of traditional testing.

15.3 Explain how to use formative assessment to improve instruction and describe ways to design and evaluate authentic assessments, including portfolios, performances, and the development of rubrics.

15.4 Describe the effects of grading on students and the types of strategies teachers can use to communicate to parents about grades.

15.5 Explain how to interpret common standardized test scores (percentile rank, stanine, grade-equivalent, scale score) as well as current issues and criticisms concerning accountability and teacher evaluation, high-stakes assessment, growth versus proficiency tests, and value-added approaches.

OUTLINE

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MODULE 45 Key Concepts in Assessment and Testing

Learning Objective 15.1 Describe the basics of assessment including types of assessments (standardized tests, classroom assessments, and measurements, as well as formative, interim, and summative assessments) and explain how reliability, validity, and absence of bias are used to understand and judge assessments.

Learning Objective 15.2 Describe two kinds of test interpretations (norm-referenced and criterion-referenced), how to use selected-response and constructed-response/essay testing appropriately in teaching, and the advantages as well as criticisms of traditional testing.

Basics of Assessment

Would it surprise you to learn that published tests, such as college entrance exams, are creations of the 20th century? In the early to mid-1900s, college entrance was generally based on grades, essays, and interviews. From your own experience, you know that testing has come a long way since then—too far, say some critics. Published tests today are called **standardized tests** because they are administered, scored, reported, and interpreted in a *standard* manner—same directions, time limits, and scoring for all (Popham, 2020). The schools where you teach probably will use standardized tests, especially to meet the growing demands for accountability. In most schools, however, teachers do not have much say in selecting these tests.

Standardized tests
Tests given, usually nationwide, under uniform conditions and scored according to uniform procedures.

Classroom assessments, on the other hand, are created or selected by teachers. Classroom assessments can take many different forms—unit tests, essays, portfolios, group projects, performances, oral presentations, videos, designs and plans, journals, websites, wikis, or products such as artwork or clothing—the list is long. Assessments are critical because teaching involves making many kinds of judgments—decisions based on values: "Is this software or book appropriate for my students?" "Should Olivia get a B− or a C+ on the project?" This cluster is about the judgments involved in all forms of assessment and grading, with an emphasis on classroom assessments—the kind you will create and interpret.

Classroom assessments
Classroom assessments are selected and created by teachers and can take many different forms—unit tests, essays, portfolios, projects, performances, oral presentations, and so on.

Before we look at either classroom or standardized assessments, let's examine some key distinctions that apply to both, beginning with the difference between measurement and assessment.

Measurement and Assessment

Measurement is quantitative—the description of an event or characteristic using numbers. Measurement tells how much, how often, or how well by providing scores, ranks, or ratings. Instead of saying, "Noah doesn't seem to understand addition," a teacher might say, "Noah answered only 2 of the 15 problems correctly in his addition homework." Measurement also allows a teacher to compare one student's performance on a particular task with either a specific *standard* or the performances of *other students* on the same task.

Measurement
An evaluation expressed in quantitative (number) terms.

Not all teachers' decisions involve measurement. But measurement, when properly done, can provide unbiased data for decisions. In fact, *data-based decision making* is very important in today's schools.

Increasingly, measurement specialists are using the term *assessment* to describe the process of gathering information from a range of sources about students' learning. **Assessment**

Assessment
Procedures used to obtain information about student performance.

consists of many ways—quantitative and qualitative—to sample and observe students' skills, knowledge, and abilities, so assessment is the broader term that includes measurement along with many other techniques (Brookhart & Nitko, 2019). Assessments can be formal, such as planned unit tests, or informal, such as observing who emerges as a leader during group work. Assessments can be designed by classroom teachers or by local, state, or national agencies. And today, assessments can go well beyond paper-and-pencil exercises to include judgments based on students' performances, portfolios, projects, or products (Popham, 2020).

FORMATIVE, INTERIM, AND SUMMATIVE ASSESSMENT. There are three general uses or purposes for assessment, depending on where you are in the instructional cycle: formative, interim, and summative assessment (Northwest Education Association, 2015).

Formative assessment is a process that occurs before or during instruction. The purposes of formative assessment are to guide the teacher in planning and adjusting instruction and to provide feedback to help students improve learning. In other words, formative assessment helps *form* instruction by providing feedback that supports the efforts of both teachers and students (Brookhart, 2018; Dixson & Worrell, 2016). Students often take a formative assessment before instruction, a **pretest** that helps the teacher determine what students already know. Teachers sometimes assess during instruction to see what areas of weakness remain so they can direct teaching toward the problem areas. These formative assessments are not graded, so students who tend to be very anxious about "real" tests may find this low-pressure practice in test taking especially helpful. Also, the feedback from formative tests can help students become better judges of quality and more self-regulated in their learning (Clark, 2012).

Formative assessment
Ungraded testing used before or during instruction to aid in planning and diagnosis.

Pretest
Formative test for assessing students' knowledge, readiness, and abilities before instruction begins.

Interim (growth or benchmark) assessments occur at regular intervals during the school year to determine student progress and growth in an objective way. These assessments might be used to differentiate instruction, determine if special services are appropriate, assess progress in Response to Intervention (RtI) programs (see Cluster 5), or evaluate whether a particular curriculum is working as hoped (NWEA, 2015). Some standardized test packages now have interim assessments to help teachers determine whether their students are making good progress and if they will be ready for the standardized test when it comes (Dixson & Worrell, 2016). For an example of interim assessments used by about 12 states, see the Smarter Balanced Assessment System at https://www.smarterbalanced.org.

Interim (growth or benchmark) assessments
Assessments that occur at regular intervals during the school year to determine student progress and growth in an objective way.

Summative assessment occurs at the end of instruction. Its purpose is to measure the students' level of proficiency—have they learned the prescribed content and skills? Summative assessment, therefore, provides a *summary* of students' accomplishments. The final exam is a classic example. Standardized tests such as the SAT or GRE are also summative—they assess what you have learned.

Summative assessment
Testing that follows instruction and assesses achievement.

Some educators say formative is assessment *for* learning and summative is assessment *of* learning (Chappuis & Stiggins, 2020). The distinctions among formative, interim, and summative assessments, however, are really based on how the results are used. If the purpose of the assessment is to improve your teaching and help students guide their own learning, then the evaluation is *formative*. If the purpose is to track growth and progress over time, the assessment is *interim*. And if the purpose is to evaluate final achievement (and help report a course grade), the assessment is *summative* (Dixson & Worrell, 2016). In fact, the same assessment could be used as a formative evaluation at the beginning of the unit, as an interim assessment during the unit, and as a summative evaluation at the end. Because the formative uses of assessment are really the most important in teaching, we will spend more time on them later. For now let's consider how to judge any assessment.

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Types of Assessment (II, C1, 4)

Understand the purposes of formative and summative assessment. Explain how teachers and students can make effective use of the information generated by each type of test.

Assessing the Assessments: Reliability and Validity

One of the most common problems with the use of assessments, especially tests, is misinterpretation of results. No assessment provides a perfect picture of a person's abilities; the results from a test provide only one small sample of behavior. Three factors are important in developing good assessments and interpreting results: *reliability*, *validity*, and *absence of bias*. These terms are applied most often to test scores, even though the underlying considerations apply to all assessments.

RELIABILITY OF TEST SCORES. Scores are reliable if a test gives a consistent, precise, and stable "reading" of a person's ability from one occasion to the next, assuming the person's ability remains the same. A reliable thermometer works in a similar manner, giving you a reading of 100°C each time you measure the temperature of boiling water. So, when you see "reliability," think consistency and precision of measurement. There are several ways to compute **reliability**, but all the possibilities give numbers between 0.0 and 1.0, like a correlation coefficient. Above .90 is considered very reliable; .80 to .90 is good, and below .80 is not very good reliability for standardized tests such as the SAT or ACT—most of these have a test-retest reliability of .80 to .90 based on about 3 months between testings (Brookhart & Nitko, 2019). Generally speaking, longer tests are more reliable than shorter ones.

Reliability
Consistency of test results.

Errors in Test Scores. All tests are imperfect estimators of the qualities or skills they are trying to measure. There are sources of error related to the student such as mood, motivation, test-taking skills, or even cheating. Sometimes the errors are in your favor, and you score higher than your knowledge might warrant; sometimes the errors go against you. There are also sources of error related to the test itself: the directions are unclear, the reading level is too high, the items are ambiguous, or the time limits are wrong.

The score each student receives always includes some amount of error. How can scores be more precise and error-free? As you might guess, this returns us to the question of reliability. The more reliable the test scores are, the less error there will be in the score actually obtained. On standardized tests, the developers take this into consideration and make estimations of how much the students' scores would probably vary if they were tested repeatedly. This estimation is called the **standard error of measurement**. Thus, a reliable test can also be defined as one with a small standard error of measurement.

Standard error of measurement
Hypothetical estimate of variation in scores if testing were repeated.

Confidence Interval. Never base your opinion of a student's ability or achievement on the exact score the student obtains. For standardized tests, many test companies now report scores using a **confidence interval**, or "standard error band," that encloses the student's actual score. This makes use of the standard error of measurement and allows a teacher to consider the range of scores that might include a student's **true score**—the score the student would get if the measurement were completely accurate and error-free.

Confidence interval
Range of scores within which an individual's true score is likely to fall.

True score
The score the student would get if the measurement were completely accurate and error-free.

Assume, for example, that two students in your class take a standardized achievement test in Spanish. The standard error of measurement for this test is 5. One student receives a score of 79 and the other a score of 85. At first glance, these scores seem quite different. But when you consider the standard error bands around the scores, not just the scores alone, you see that the bands overlap. The first student's true score might be anywhere between 74 and 84 (that is, the actual score of 79 plus or minus the standard error of 5). The second student's true score might be anywhere between 80 and 90. Both students could have the same true score of 80, 81, 82, 83, or 84 because the score bands overlap at those numbers. It is crucial to keep in mind the idea of standard error bands when selecting students for special programs. No child should be rejected simply because the score obtained missed the cutoff by 1 or 2 points. The student's true score might well be above the cutoff point. See Figure 15.5 later in this cluster for a test report that includes these score bands.

You can apply the same reasoning to political surveys—they generally report a margin of error (usually in very small print at the bottom of the TV screen). If a particular survey in Michigan, say, had one candidate at 47% and the other at 53%, the results would be a "statistical tie" (the language you hear on television) if the poll had a margin of error of ±4%. That is because either candidate's true percentage could be in the overlapping band of 49%, 50%, or 51%. Differences between candidates' ratings are truly different and reliable only when the score bands *do not* overlap.

VALIDITY. If test scores are sufficiently reliable, the next question is whether the scores are valid or, more accurately, whether the judgments and decisions based on the test scores are valid. To have **validity**, the decisions and inferences based on the test must be supported

Validity
Degree to which a test measures what it is intended to measure.

by evidence. This means that validity is judged in relation to a particular use or purpose—that is, in relation to the actual decision being made and the evidence for that decision. A particular test might be valid for one purpose but not for another (Haertel, 2018; Popham, 2020).

Different kinds of evidence support a particular judgment. If the purpose of a test is to measure the skills covered in a course, then we want *content-related evidence of validity*, so we should see test questions on all the important course topics and not on extraneous information. Have you ever taken a test that dealt only with a few ideas from one lecture or just a few pages of the textbook? Then decisions based on that test (like your grade) certainly lacked content-related evidence of validity.

Some tests are designed to predict outcomes. The SATs, for example, are intended to predict performance in college. If SAT scores correlate with academic performance in college as measured by the criterion of, say, grade-point average in the first year, then we have *criterion-related evidence of validity* for the use of the SAT in admissions decisions.

Most standardized tests are designed to measure some psychological characteristic or "construct" such as reasoning ability, reading comprehension, achievement motivation, intelligence, creativity, and so on. It is a bit more difficult to gather *construct-related evidence of validity*, yet this is a very important requirement—probably the most important. Construct-related evidence of validity is gathered over many years. It is indicated by correlations with other established tests and logical patterns of scores. For example, older children can answer more questions on intelligence tests than younger children can. This fits with our *construct* of intelligence. If the average 5-year-old answered as many questions correctly on a test as the average 13-year-old, we would doubt that the test really measured intelligence. Today, many psychologists suggest that gathering content- and criterion-related evidence are simply ways of determining if the test actually measures the construct it was designed to measure.

A test must be reliable in order to be valid. For example, if an intelligence test yields different results each time it is given to the same child over the course of a few months, then, by definition, it is not reliable. Certainly, it couldn't be a valid measure of intelligence because intelligence is assumed to be fairly stable, at least over a short period of time. However, reliability will not guarantee validity. If that intelligence test gave the same score every time for a particular child but didn't predict school achievement, speed of learning, or other characteristics associated with intelligence, then performance on the test would not be a true indicator of intelligence. The test would be reliable—but invalid. Reliability and validity are issues with all assessments, not just standardized tests but classroom assessments as well.

ABSENCE OF BIAS. The third important criterion for judging assessments is absence of bias. **Assessment bias** "refers to qualities of an assessment instrument that offend or unfairly penalize a group of students because of their gender, race, ethnicity, socioeconomic status, religion, or other such group-defining characteristic" (Popham, 2020, p. 128). Biases are aspects of the assessment such as content, language, or examples that might distort the performance of a group—either for better or for worse.

Assessment bias
Qualities of an assessment instrument that offend or unfairly penalize a group of students because of the students' gender, socioeconomic status, race, ethnicity, and so on.

Offensiveness occurs when a particular group might be insulted by the content of the assessment. Offended, angry students may not perform at their best. What about *unfairly penalizing* test takers based on ethnic, racial, gender, religious, or social class biases? Many people believe that tests can unfairly penalize some groups who may not have an equal opportunity to show what they know on the test because the language of the test and the tester may be different from the languages of the students. Also, tests may reflect unfair penalization because different groups have had different opportunities to learn the material tested. The questions asked tend to center on experiences and facts more familiar to students from the dominant culture than to students from minority groups. Consider this test item for fourth-graders described by Popham (2020, p. 375):

My uncle's field is computer programming.

Look at the sentences below. In which sentence does the word *field* mean the same as it does in the boxed sentence above?

A. The softball pitcher knew how to *field* her position.

B. They prepared the *field* by spraying and plowing it.

C. I know the *field* I plan to enter when I finish college.

D. The doctor used a wall chart to examine my *field* of vision.

Items like this are included on most standardized and textbook tests. But not all family members describe their work as a *field* of employment. What if your parents worked at a grocery store or a car repair shop? Are these fields? Life outside class has prepared some students, but not others, for this item. The meaning of "field" is part of your cultural knowledge. When you think about it, how can you separate background, context, and culture from cognition? Every student's learning is embedded in his or her culture, and every test question emerges from some kind of cultural knowledge, so be sensitive to the kinds of questions you ask. And the purpose of the assessment can actually affect evaluators' judgments. For example, when participants in a study were told the purpose was to evaluate the student's work to give grades based on the number of mistakes, the evaluators found more mistakes if they thought the student was from a lower-SES family. If the evaluators were told the purpose was to give feedback to guide learning, the gap in finding mistakes for high- and low-SES students was reduced (Autin et al., 2019).

With this background in the basic concepts of formative, interim, and summative assessments and attention to reliability, validity, and absence of bias, we are ready to enter the classroom.

Classroom Assessment: Testing

Stop & Think Think back to your most recent test. What was the format? Did you feel that the test results were an accurate reflection of your knowledge or skills? Have you ever had to design a test? What makes a good, fair test?

When most people think of assessments in a classroom, they usually think of testing. As you will see shortly, although teachers today have many other options, testing is still a significant activity in most classrooms. In this section, we will examine how to interpret test scores, evaluate the tests that accompany standard curriculum materials, and write your own test questions.

Interpreting Any Test Score

Before we even look at different kinds of tests, there is an important consideration. The outcome of any test has no meaning by itself; we must make some kind of comparison in order to interpret test results. There are two basic types of comparisons: In the first, a test score is compared to the scores obtained by other people who have taken the same test. This is called a *norm-referenced comparison*. The second type is *criterion-referenced*. Here, the score is compared to a fixed standard or minimum passing score. The same test can be interpreted in either a norm-referenced or criterion-referenced way, depending on the type of comparison made.

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Traditional Assessment (II C1, 2, 4)

Selected-response and essay tests continue to have important roles in effective assessment and evaluation programs. Describe the appropriate uses of these types of tests. Identify the advantages and limitations of each.

Norm-referenced testing
Testing in which scores are compared with the average performance of others.

Norm group
Large sample of students serving as a comparison group for scoring tests.

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Criterion-/Norm-Referenced Tests (II, C5)

The ERIC Digest *Norm- and Criterion-Referenced Testing* (https://eric.ed.gov/?id=ED410316) describes the purposes, content, and issues related to criterion- and norm-referenced tests.

Giving accurate feedback to parents is part of a teacher's job. When talking with a parent about a child's abilities, do you think the use of norm-referenced or criterion-referenced test results is more desirable?

NORM-REFERENCED TEST INTERPRETATIONS. In **norm-referenced testing**, the people who have taken the test provide the norms for determining the meaning of a given individual's score or grade. You can think of a *norm* as being the typical level of performance for a particular group. By comparing the individual's raw score (the actual number correct) to the norm, we can determine if that raw score is above, below, or around the average for that group. There are at least four types of **norm groups** (comparison groups) in education—the class or school itself, the school district, national samples, and international samples. Students in national norm groups used for large-scale assessment programs are tested one year, and then the scores for that group serve as comparisons or norms every year for several years until the test is revised, or *re-normed*. The norm groups are selected so that all socioeconomic status (SES) levels are included in the sample. Because students from high-SES backgrounds tend to do better on many standardized tests, a high-SES school district will almost always have higher scores compared to the national norm group that includes a wide range of SES levels.

Norm-referenced tests cover many general outcomes. They are especially appropriate when only the top few candidates can be admitted to a program. However, norm-referenced measurement has its limitations. The results of a norm-referenced test do not tell you whether students are ready to move on to more advanced material. For instance, knowing that two students are in the top 3% of the class on a test of algebraic concepts will not tell you if they are ready to move on to advanced math; everyone in the class may have a limited understanding of the algebraic concepts, and no one may be ready to move on.

Norm-referenced tests also are not particularly appropriate for measuring affective and psychomotor outcomes. To measure individuals' psychomotor learning, you need to compare their performance to a clear description of standards. In the affective area, attitudes and values are personal; comparisons among individuals are not really appropriate. For example, how could we measure an "average" level of artistic preferences? Finally, norm-referenced tests tend to encourage competition and comparison of scores. Some students compete to be the best. Others, realizing that being the best is impossible, may compete to be the worst. Both goals have their casualties.

Criterion-referenced testing
Testing in which scores are compared to a set performance standard.

CRITERION-REFERENCED TEST INTERPRETATIONS. When test scores are compared not to the scores of others but to a given criterion or standard of performance, this is called **criterion-referenced testing**. To decide who should be allowed to drive a car, it is important to determine just what standard of performance works for selecting safe drivers. It does not matter how your test results compare with the results of others. If your performance on the test was in the top 10% but you consistently ran through red lights, you would not be a good candidate for receiving a license, even though your score was high.

Criterion-referenced tests measure the mastery of a very specific learning target. For example, a criterion-referenced test would be useful in measuring the students' ability to add three-digit numbers. A test could be designed with 20 different problems, and the standard for mastery could be set at 17 correct out of 20. (The standard is often somewhat arbitrary and may be based on such things as the teacher's experience.) If two students receive scores of 7 and 11, it does not matter that one student did better than the other because neither met the standard of 17. Both need more help with addition. The results of a criterion-referenced test should tell the teacher exactly what the students can and cannot do, at least under certain conditions; thus, these are the right kinds of tests for formative and interim assessments.

When teaching basic skills, comparison to a preset standard is often more important than comparison to the performance of others. It is not very comforting to know, as a parent, that your child is better in reading than most of the students in her class if none of the students is reading at grade level. Sometimes standards for meeting the criterion must be set at 100% correct. You would not like to have your appendix removed by a surgeon who left surgical instruments inside the body *only* 10% of the time.

Criterion-referenced tests are not appropriate for every situation. Many subjects cannot be broken down into a set of specific targets. And, although standards are important in criterion-referenced testing, they can often be arbitrary, as you have already seen. When deciding whether a student has mastered the addition of three-digit numbers comes down to the difference between 16 or 17 correct answers, it seems difficult to justify one particular standard over another. Finally, at times, it is valuable to know how the students in your class compare to other students at their grade level both locally and nationally. You can see that each type of test is well suited for certain situations, but each also has its limitations.

Using the Tests from Textbooks

Most elementary and secondary school texts today come complete with supplemental materials such as teaching manuals and ready-made tests. Using these tests can save time, but is this good teaching practice? The answer depends on your learning targets, the way you teach the material, and the quality of the tests provided. If the textbook test:

- Is of high quality,
- Covers all your learning goals,
- Matches your testing plan,
- Asks student to know and do what they were taught, and
- Fits the instruction you actually provided for your students,

then it may be the right test to use.

Check the reading level of the items provided and be prepared to revise and improve them to meet the needs of your class (McMillan, 2019; Russel & Airasian, 2012).

What if no tests are available for the material you want to cover or the tests provided in your teachers' manuals are not appropriate for your students? Then it's time for you to create your own tests. We will consider the two major kinds of traditional tests—selected-response and constructed response/essay.

Selected-Response Testing

Multiple-choice questions, matching exercises, true/false statements, and short-answer or fill-in items are all types of **selected-response testing**. The scoring of these types of items is relatively straightforward because the answers are more clear-cut than essay answers. These types of items are what many of us envision when we think of "traditional" testing (Chappuis & Stiggins, 2020).

Selected-response testing
A form of testing in which students choose the correct response from a set of possible responses provided by the teacher or the test developer instead of creating their own response. Multiple-choice and true-false tests are common examples of selected response testing.

How should you decide which item format is best for a particular test? Use the one that provides the most direct measure of the Learning Objective you intended for your students. In other words, if you want to see how well students can write a letter, have them write a letter, don't ask multiple-choice questions about letters. But if many different item formats will work equally well, then use multiple-choice questions because they are easier to score fairly and can cover many topics. Switch to other formats if writing good multiple-choice items for the material is not possible or appropriate. For example, if related concepts such as terms and definitions need to be linked, then a matching item is a better format than multiple-choice. If it is difficult to come up with several wrong answers for a multiple-choice item, try a true/false question instead. Alternatively, ask the student to supply a short answer that completes a statement (fill in the blank). Variety in testing can lower students' anxiety because the entire grade does not depend on one type of question that a particular student may find difficult. Table 15.1 on the next page gives guidance for using true/false, matching, and fill-in-the-blank items.

We will look closely at the multiple-choice format because it is the most versatile—and the most difficult to use well.

Table 15.1 Guidance for Using True/False, Matching, and Fill-in-the-Blank Items

Here is a checklist for your test preparation.

GUIDELINE FOR TRUE/FALSE ITEMS

_____ Write the item as a simple declarative sentence.
_____ Make items entirely true or entirely false as stated—no complex "idea salads" with some truth and some falsehood.

GUIDELINES FOR MATCHING ITEMS

_____ Provide clear directions for making the match.
_____ Keep the list of items to be matched short—no more than 10.
_____ Include only homogeneous items—don't mix names, dates, events, and so on.
_____ Keep the wording of the response options short and grammatically the same. Don't let grammar be a clue.
_____ Provide more response options than items to be matched so students can't guess the last match because only one answer is left.

GUIDELINES FOR FILL-IN ITEMS

_____ Ask a question. Don't just make a statement with a blank in it—more than one answer might work in a statement.
_____ Provide one blank per item—ask one question, get one answer, and then move to the next question.
_____ Don't make the length of the blank a clue either.
_____ Put the blank toward the end.

Source: Adapted from Chappuis, J., & Stiggins, R. J. (2020). *An introduction to student-involved assessment for learning* (3rd ed.)., pp. 156–157. Pearson. Adapted with permission. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., New York, NY.

USING MULTIPLE-CHOICE TESTS. Even though your education professors may reject the use of multiple-choice tests, about 50% of public school teachers endorse these tests (Banks, 2012), so you should know how to use them well. Giving students experience answering multiple-choice tests (as long as this format fits your learning targets) may help prepare the students for state achievement testing that relies on multiple-choice items (Chappuis & Stiggins, 2020).

Carefully written multiple-choice items can assess higher-order outcomes if you ask students to apply or analyze a concept, but crafting these items is not easy (Waugh & Gronlund, 2013). For example, Mark Smith (2017) asked 12th-grade students to "think aloud" as they answered multiple-choice items from a U.S. history test on the National Assessment of Educational Progress—a well-known standardized test. The items were intended to measure historical thinking, but the results of the think-alouds indicated that the items really assessed factual knowledge, reading comprehension, and test-taking skills.

WRITING MULTIPLE-CHOICE QUESTIONS. Some students jokingly refer to multiple-choice tests as "multiple-guess" tests—a sign that these tests are often poorly designed. Your goal in writing test items is to design them so that they measure student achievement, not test-taking and guessing skills, and this can be a challenge.

Stem
The question part of a multiple-choice item.

Distractors
Wrong answers offered as choices in a multiple-choice item.

The **stem** of a multiple-choice item is the part that asks the question or poses the problem. The choices that follow are called *alternatives*. The wrong answers are called **distractors** because their purpose is to distract students who have only a partial understanding of the material. If there were no good distractors, students with only a vague understanding would have no difficulty in finding the right answer. The *Guidelines: Writing Multiple-Choice Test Items* should help you write good stems and alternatives.

Constructed Responses: Essay Testing

The best way to measure some learning targets is to ask students to create answers on their own; essay questions are one way to accomplish this. When you want to assess mastery of larger chucks of knowledge (like asking students how atoms combine to form other substances) or evaluate reasoning (give a rationale for an experiment), then a constructed response is a good choice (Chappuis & Stiggins, 2020). The most difficult part of

GUIDELINES

Writing Multiple-Choice Test Items

Make the stem clear and simple, and present only a single problem. Ask a complete question with no unessential details.

Example

Poor

There are several different kinds of standard or derived scores. An IQ score is especially useful because

Better

An advantage of an IQ score is

State the problem in the stem in positive terms. Negative language is confusing. If you must use words such as *not, no, all but*, or *except*, underline them or type them in all capitals.

Example

Poor

Which of the following is not a standard score?

Better

Which of the following is **NOT** a standard score?

Do not expect students to make extremely fine discriminations among answer choices.

Example

The percentage of area in a normal curve falling between $+1$ and -1 standard deviations is about:

Poor

a. 66%.
b. 67%.
c. 68%.
d. 69%.

Better

e. 14%.
f. 34%.
g. 68%.
h. 95%.

Make sure each alternative answer fits the grammatical form of the stem so that no answers are obviously wrong.

Example

Poor

The Stanford-Binet test yields an

a. IQ score.
b. reading level.
c. vocational preference.
d. mechanical aptitude.

Better

The Stanford-Binet is a test of

a. intelligence.
b. reading level.
c. vocational preference.
d. mechanical aptitude.

(Continued)

Word response options as briefly as possible, and make sure they are grammatically the same (Chappuis & Stiggins, 2020, p. 155).

Example

Poor

Why did colonists migrate to the United States?

a. To escape heavy taxation by their native governments.
b. Religion.
c. They sought the adventure of living among Native Americans in the new land.
d. There was the promise of great wealth in the New World.

Better

Why did colonists migrate to the United States?

a. To escape taxation
b. For religious freedom
c. For adventure
d. To become rich

Avoid including two distractors that have the same meaning.

If only one answer can be right, and if two answers are the same, then these two must both be wrong. This narrows down the choices considerably.

Avoid using categorical words such as *always, all, only*, or *never* unless they can appear consistently in all the alternatives.

Most smart test takers know that categorical answers are usually wrong.

Avoid using the exact wording found in the textbook.

Poor students may recognize the answers without knowing what they mean.

Avoid overuse of *all of the above* and *none of the above*.

Such choices may be helpful to students who are simply guessing. In addition, using *all of the above* may trick a quick student who sees that the first alternative is correct and does not read on to discover that the others are correct, too.

Avoid obvious patterns on a test. They aid students who are guessing.

The position of the correct answer should be varied, as should its length.

Make sure there is only one correct or best answer.

If more than one answer might be correct, make sure the stem clearly asks for the "best" answer.

Base distractors on common errors and misconceptions (Gierl et al., 2017).

essay testing is judging the quality of the answers, but writing good, clear questions is not particularly easy, either.

CONSTRUCTING ESSAY TESTS. Because answering essay questions takes time, true essay tests cover less material than selected-response tests. Thus, for efficiency, essay tests should be limited to the assessment of important, complex Learning Objectives. A good essay question includes (a) a clear and specific *context* for the question, (b) a statement of what students should *describe or explain*, and (c) *guidelines* for what should be covered in the answer. Here is an example:

> We have been studying the importance of the carbon cycle and how it works [*context*]. Based on your understanding of the carbon cycle, explain (a) why we

need to know about it, and (b) how carbon moves from one place to another [*what to describe or explain*]. Be sure to include the following [*guidelines*]:

- Why it is important to understand the carbon cycle (5 points)
- The four major reservoirs where carbon is stored (4 points)
- At least six ways that carbon gets transferred from one place to another (6 points) (Chappuis & Stiggins, 2020, pp. 187–188)

Students need ample time to answer a question like this. If more than one essay is assigned in the same class period, you may want to suggest time limits for each question. Remember, however, that time pressure increases anxiety and may prevent accurate assessment of some students. Whatever your approach, don't try to make up for the limited amount of material an essay test can cover by including a large number of questions. Rather than including more than two or three essay questions in a single class period, it would be better to plan on more frequent testing. Combining an essay question with a number of selected-response items is one way to prevent the problem of limited sampling of course material (Waugh & Gronlund, 2013).

EVALUATING ESSAYS. When possible, a good first step in grading essays is to construct a set of scoring criteria or a rubric (more on this later) and share it with students. After all, students can succeed only if they know what success means—what does success look like (Chappuis & Stiggins, 2020)? Here is an example of a question and criteria from TenBrink (2003, p. 326).

> *Question:* Defend or refute the following statement: Civil wars are necessary to the growth of a developing country. Cite reasons for your argument and use examples from history to help substantiate your claim.
>
> *Scoring Rubric:* All answers, regardless of the position taken, should include (a) a clear statement of the position, (b) at least five logical reasons, (c) at least four examples from history that clearly substantiate the reasons given.

Once you have set your expectations for answers, you can assign points to the various parts of the essay. You might also give points for the organization of the answer and the internal consistency of the essay. You can then assign grades such as 1 to 5 or A, B, C, D, and F and sort the papers into piles by grade. As a final step, skim the papers in each pile to see if they are comparable in quality. These techniques will help ensure fairness and reliability in grading.

When grading essay tests that contain several questions, it makes sense to grade all responses to one question before moving on to the next. This helps prevent the quality of a student's answer to one question from influencing your reaction to the student's other answers. After you finish reading and scoring the first question, shuffle the papers so that no students end up having all their questions graded first (e.g., when you may be taking more time to give feedback or are applying stricter standards) or last (when you may be tired of writing feedback or more lax in your standards). You may achieve greater objectivity if you ask students to put their names on the back of the paper so that grading is anonymous.

Assessing Traditional Testing

Your stand on traditional testing is part of your philosophy of teaching. First consider the positives of testing—right answers are important. Even though schooling is about learning to think and solve problems, it is also about knowledge. Students must have something to think about—facts, ideas, concepts, principles, theories, explanations, arguments, images, opinions. One reason that American students, compared with students in many other developed countries, lack essential knowledge may be because American schools emphasize

process—critical thinking, self-esteem, problem solving—more than content. To teach more about content, teachers will need to assess content learning. Well-designed traditional tests can evaluate students' knowledge effectively and efficiently and thus provide feedback for students and information for teacher planning (Popham, 2020). But there are strong criticisms as well. Do traditional tests really tell us what students can do with that knowledge out in the real world? True understanding cannot be measured by tests that ask students to use skills and knowledge *out of context*.

Let's look at a few alternative approaches to classroom assessment.

Module 45 Summary

Basics of Assessment (pp. 653–657)

Distinguish between measurement and assessment. Measurement is the description of an event or characteristic using numbers. Assessment includes measurement but is broader because it includes all kinds of ways to sample and observe students' skills, knowledge, and abilities.

Distinguish among formative, interim, and summative assessment. In the classroom, formative (ungraded, diagnostic assessment) helps form and support learning by providing feedback to both the students and the teacher. Interim (growth) assessments occur at regular intervals during the school year to determine student progress in an objective way—to see if the students are moving toward proficiency. Summative assessment occurs at the end of instruction and summarizes students' accomplishments in order to report on achievement.

What is test reliability? Some tests are more reliable than others; that is, they yield more stable and consistent estimates. Care must be taken in the interpretation of test results. Each test is only a sample of a student's performance on a given day. The score is only an estimate of a student's hypothetical true score. The standard error of measurement takes into account the possibility for error and is one index of test reliability.

What is test validity? The most important consideration about a test is the validity of the decisions and judgments that are based on the test results. Evidence of validity can be related to content, criterion, or construct. Construct-related evidence for validity is the broadest category and encompasses the other two categories of content and criterion. Tests must be reliable to be valid, but reliability does not guarantee validity.

What is absence of bias? Tests must be free of assessment bias. Bias occurs when tests include material that offends or unfairly penalizes a group of students because of the students' gender, SES, race, religion, or ethnicity. Culture-fair tests have not proved to solve the problem of assessment bias.

Classroom Assessment: Testing (pp. 657–664)

Distinguish between norm-referenced and criterion-referenced tests. In norm-referenced tests, a student's performance is compared to the average performance of others. In criterion-referenced tests, scores are compared to a preestablished standard. Norm-referenced tests cover a wide range of general learning goals. However, results of norm-referenced tests do not tell whether students are ready for advanced material, and they are not appropriate for affective and psychomotor learning goals. Criterion-referenced tests measure the mastery of very specific goals.

How can testing support learning? Learning is supported by frequent testing using cumulative questions that ask students to apply and integrate knowledge. With the goals of assessment in mind, teachers are in a better position to design their own tests or evaluate the tests provided by textbook publishers.

Describe two kinds of traditional testing. Two traditional formats for testing are the selected-response test and the constructed-response/essay test. Selected-response tests, which can include multiple-choice, true/false, fill-in, and matching items, should be written with specific guidelines in mind. Writing and scoring essay questions requires careful planning, in addition to criteria to discourage bias in scoring.

MODULE 46 Formative Assessment and Grading

Learning Objective 15.3 Explain how to use formative assessment to improve instruction and describe ways to design and evaluate authentic assessments, including portfolios, exhibitions, performances, and the development of rubrics.

Learning Objective 15.4 Describe the effects of grading on students and the types of strategies teachers can use to communicate to parents about grades.

Formative and Authentic Classroom Assessments

Formative assessments, as you saw earlier, are assessments *for* learning. They help *form* and support instruction. Formative assessments may be as informal and "on the fly" as the teacher noticing many students in Spanish class are having trouble with one particular verb construction in conversations and homework to as formal as quizzes embedded in the curriculum that are just like tests but don't count toward a grade. As emphasis on formative assessment has increased around the world, achievement is increasing as well (Chappuis & Stiggins, 2020; Decristan et al., 2015).

Early on in a unit, assessments should be formative (provide feedback but not count toward a grade), saving the actual graded assessments for later in the unit when all students have had the chance to learn the material. One approach is informal assessments.

Informal Assessments

Informal assessments are ungraded assessments that gather information from multiple sources to help teachers make decisions (Banks, 2012). Two examples of informal assessment are exit tickets and journals.

Informal assessments
Ungraded (formative) assessments that gather information from multiple sources to help teachers make decisions.

EXIT TICKETS. The exit ticket is a simple assessment and can even be done "on the fly" as you notice students struggling. After a lesson, the teacher poses a question or problem. Then each student answers on a separate sheet of paper that becomes her or his ticket to leave the class. Before the next class, the teacher reviews the tickets and creates small discussion groups made up of at least one student with a solid understanding of the material mixed in with students who are struggling. After reviewing and reteaching the concepts that seem to have been the most misunderstood, the teacher tells the students to discuss the exit ticket question in their groups and identifies the students who have a solid understanding as the "topic leaders" (Dixson & Worrell, 2016). Other exit ticket assessments include a 2-minute fast write about the key ideas in the lesson or a description of the "muddiest point," the idea that was most confusing or unclear. Students don't even have to put their names on these exit tickets, but a quick read will tell the teacher where reteaching and explanation are needed the next day.

JOURNALS. Individual and group journals are flexible and widely used informal assessments. Teachers may consult the journals to learn students' concerns and interests so instruction can be more authentic and engaging. But often journals focus on academic learning, usually through responses to prompts. Banks (2012, p. 113) describes one high school physics teacher who asked his students to respond to these three questions in their journals:

1. How can you determine the coefficient of friction if you know only the angle of the inclined plane?
2. Compare and contrast magnetic, electronic, and gravitational fields.
3. If you were to describe the physical concept of sound to your best friend, what music would you use to demonstrate this concept?

When he read the students' journals, the teacher realized that many of the students' basic assumptions about friction, acceleration, and velocity came from personal experiences and not from scientific reasoning. His approach to teaching had to change to reach the students. The teacher never would have known to make the changes in his instruction without reading the journals, which served in this case as a formative assessment.

There are many other kinds of informal assessments. Every time teachers ask questions or watch students perform skills, the teachers are conducting informal assessments.

INVOLVING STUDENTS IN ASSESSMENTS. One way to provide feedback and develop students' sense of efficacy for learning is to involve the students in the formative assessment process. Students can keep track of their own progress and assess their improvement. Here are other ideas, some taken from Chappuis and Stiggins (2020). Students might:

- Learn about the criteria for judging work by examining and discussing with a peer examples of good, average, and poor products or performances. Then pick a poor example and revise to improve it.
- Describe to the teacher or a peer (orally or in writing) the way they approached an assignment, the problems they encountered, the options they considered, and the final result.
- Analyze their strengths and weaknesses before starting a project and then discuss with the teacher or peers how they will use their strengths and overcome their weaknesses as they work on the project.
- In pairs, make up questions that might be on the test, explain why those are good questions, and then answer them together.
- Look back at earlier work and analyze how they have grown by describing "I used to think… but now I know…." After doing a few of these analyses, summarize using a frame such as: What did I know before I started? What did I learn? What do I want to learn next?
- Before a major test, do a free write on these prompts: "What exactly will be on the test?" "What kinds of questions will be asked (multiple-choice, essay, etc.)?" "How well will I do?" "What do I need to study to make sure I am ready?"

Authentic assessments
Assessment procedures that test skills and abilities as they would be applied in real-life situations.

Students also can provide themselves with formative feedback by completing the quiz analysis sheet in Figure 15.1 on the next page. After an ungraded quiz, students analyze their mistakes and make plans for improving. This approach makes good use of the quiz—especially because many students just toss the papers without learning anything from the outcome.

Authentic Assessments: Performances and Portfolios

Authentic assessments ask students to apply skills and abilities as they would in real life. For example, they might use fractions to enlarge or reduce recipes. If our instructional goals for students include the abilities to write, speak, listen, create, think critically, do research, solve problems, or apply knowledge, then our tests should ask students to write, speak, listen, create, think, research, solve, and apply. How can this happen?

Connect and Extend to PRAXIS II®
Authentic Tests (II, C1, 2, 4)
The emphasis on student-centered learning has been accompanied by an emphasis on authentic tests. Understand the purpose, value, and advantages of these forms of assessment. Describe their characteristics and the potential problems with their use.

PERFORMANCES. Many educators suggest we look to the arts and sports for analogies to solve this problem. If we think of the "test" as being the recital, science fair project, game, mock court trial, or other performance, then teaching to the test is just fine. All coaches, artists, and musicians gladly "teach" to these "tests" because performing well on these tests is the whole point of instruction. Authentic assessment asks students to perform. The performances may be thinking performances, physical performances, creative

Figure 15.1 Reviewing and Analyzing a Quiz or Assignment

A form like this can help students analyze a quiz or assignment to serve as formative assessment. After identifying mistakes as "fixable" or "I don't get it," the student makes plans to relearn.

Reviewing My Results

Name: _____ **Assignment:** _____ **Date:** _____

Please look at your corrected test and mark whether each problem is right or wrong. Then look at the problems you got wrong and decide if you made a mistake you can fix without help. If you did, mark the "Fixable Mistake" column. For all the remaining problems you got wrong, mark the "Don't Get it" column.

Problem	Learning Target	Right	Wrong	Fixable Mistake	Don't Get it
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Analyzing My Results

I AM GOOD AT THESE!

Learning targets I got right:

I AM PRETTY GOOD AT THESE, BUT NEED TO DO A LITTLE REVIEW

Learning targets I got wrong because of a fixable mistake:

What I can do to keep this from happening again:

I NEED TO KEEP LEARNING THESE

Learning targets I got wrong and I'm not sure what to do to correct them:

What I can do to get better at them:

Source: Chappuis, J., & Stiggins, R. J. (2020). *An introduction to student-involved assessment for learning* (3rd ed.). Pearson, p. 167. Reprinted and Electronically Reproduced by Permission of Pearson Education, Inc., New York, NY.

performances, or other forms. So **performance assessment** is any form of assessment that requires students to carry out an activity or produce a product to demonstrate learning (Russell & Airasian, 2012).

Performance assessments

Any form of assessment that requires students to carry out an activity or produce a product in order to demonstrate learning.

It may seem odd to talk about thinking as a performance, but there are many parallels. Serious thinking is risky because real-life problems are not well defined. Often, the outcomes of our thinking are public; others evaluate our ideas. Like a dancer auditioning for

a Broadway show, we must cope with the consequences of being evaluated. Like a potter looking at a lump of clay, a student facing a difficult problem must experiment, observe, redo, imagine, and test solutions; apply both basic skills and inventive techniques; make interpretations; decide how to communicate results to the intended audience; and often accept criticism and improve the initial solution (Clark, 2012; Eisner, 1999).

The concern with authentic assessment has led to the development of several approaches based on the goal of performance in context. For example, instead of asking students, "If you bought a toy for 69 cents and gave the clerk a dollar, how much change would you get back?" have students work in pairs with real money to role-play making different purchases or set up a mock class store and have students make purchases and give change (Kim & Sensale Yazdian, 2014; Popham, 2020; Waugh & Gronlund, 2013).

The Center for Technology in Learning of SRI International, a nonprofit science research institute, also provides an online resource bank of performance-based assessments linked to the National Science Education Standards. The resource is called PALS (Performance Assessment Links in Science). Go to the website http://pals.sri.com; search for the performance tasks for kindergarten through 12th grade. You can select tasks by standard and grade level.

Connect and Extend to PRAXIS II®

Portfolio Assessment (II, C1, 2)

For a discussion of the advantages, limitations, design, and implementation of portfolio programs, go to https://www.teach-nology.com/litined/assessment/alternative/portfolios/.

PORTFOLIOS. For years, photographers, artists, models, and architects have had portfolios to display their skills and show to prospective employers. A **portfolio** is a systematic collection of work, often including work in progress, revisions, student self-analyses, and reflections on what the student has learned. Written work or artistic pieces are common contents of portfolios, but student portfolios might also include letters to the portfolio readers describing each entry and its importance, graphs, diagrams, pictures or digital slideshows, PowerPoint presentations, recordings of the students reading their work, unedited and final drafts of persuasive essays or poems, lists of books read, annotated website addresses, peer comments, videorecordings, laboratory reports, and computer programs—anything that demonstrates learning in the area being taught and assessed (Popham, 2020).

Portfolio

A collection of the student's work in an area, showing growth, self-reflection, and achievement.

There is a distinction between process portfolios and final, or "best-work," portfolios. The distinction is similar to the difference between formative and summative evaluation. Process portfolios document learning and show progress. Best-work portfolios showcase final accomplishments (Johnson & Johnson, 2002). Table 15.2 on the next page shows some examples of portfolios for both individuals and groups.

The *Guidelines: Creating Portfolios* on the next page give some ideas for using portfolios in your teaching.

Evaluating Portfolios and Performances

Checklists, rating scales, and scoring rubrics are helpful when you assess performances because assessments of performances and portfolios are criterion referenced, not norm referenced. In other words, the students' products and performances are compared to established public standards, not ranked in relation to other students' work.

SCORING RUBRICS. A checklist or rating scale gives specific feedback about elements of a performance. **Scoring rubrics** are rules that are used to determine the quality of a student performance, often on a 4-point scale from "excellent" (4) to "inadequate" (1) or on a scale that assigns points to each category—10 points for excellent, 6 for good, and so on (Mabry, 1999). For example, a rubric describing *excellent delegation of responsibility* in a group research project might be:

> Each student in the group can clearly explain what information the group needs, what information s/he is responsible for locating, and when the information is needed.

Scoring rubrics

Rules that are used to determine the quality of a student's performance.

This rubric was generated using Rubistar, an online service for educators that allows you to select a subject area and category and then create a rubric. To get the preceding rubric, I chose the subject of *writing*—"group planning and research project"—and the category of "delegation of responsibility."

Table 15.2 Process and Best-Works Portfolios for Individuals and Groups

Here are a few examples of how to use portfolios in different subjects.

THE PROCESS PORTFOLIO		
SUBJECT AREA	**INDIVIDUAL STUDENT**	**COOPERATIVE GROUP**
Science	Documentation (running records or logs) of using the scientific method to solve a series of laboratory problems	Documentation (observation checklists) of using the scientific method to solve a series of laboratory problems
Mathematics	Documentation of mathematical reasoning through double-column mathematical problem solving (computations on the left side and running commentary explaining thought processes on the right side)	Documentation of complex problem solving and use of higher-level strategies
Language Arts	Evolution of compositions from early notes through outlines, research notes, response to others' editing, and final draft	Rubrics and procedures developed to ensure high-quality peer editing
THE BEST-WORKS PORTFOLIO		
SUBJECT AREA	**INDIVIDUAL STUDENT**	**COOPERATIVE GROUP**
Language Arts	The best compositions in a variety of styles—expository, humor/satire, creative (poetry, drama, short story), journalistic (reporting, editorial columnist, reviewer), and advertising copy	The best dramatic production, video project, TV broadcast, newspaper, advertising display
Social Studies	The best historical research paper, opinion essay on a historical issue, commentary on current event, original historical theory, review of a historical biography, account of participation in academic controversy	The best community survey, paper resulting from academic controversy, oral history compilation, multidimensional analysis of a historical event, press corps interview with a historical figure
Fine Arts	The best creative products such as drawings, paintings, sculptures, pottery, poems, thespian performances	The best creative products such as murals, plays written and performed, inventions thought of and built

Source: Based on D. W. Johnson and R. T. Johnson (2002), *Meaningful assessment: A manageable and cooperative process.* Pearson Education, Inc.

GUIDELINES

Creating Portfolios

Involve students in selecting the pieces that will make up their portfolios.

Examples

1. During the unit or semester, ask each student to select work that fits certain criteria, such as "my most difficult problem," "my best work," "my most improved work," or "three approaches to."
2. For their final submissions, ask students to select pieces that best show how much they have learned.

Make sure the portfolios include information that shows student self-reflection and self-criticism.

Examples

1. Ask students to include a rationale for their selections.

(Continued)

2. Have each student write a "guide" to his or her portfolio, explaining how strengths and weaknesses are reflected in the work included.
3. Include self- and peer critiques, indicating specifically what is good and what might be improved.
4. Model self-criticism of your own productions.

Make sure the portfolios reflect the students' activities in learning.

Examples

1. Include a representative selection of projects, writings, drawings, and so forth.
2. Ask students to relate the goals of learning to the contents of their portfolios.

Be aware that portfolios can serve different functions at different times of the year.

Examples

1. Early in the year, it might hold unfinished work or "problem pieces."
2. At the end of the year, it should contain only what the student is willing to make public.
3. Throughout the year, the portfolios may be the basis for family night conferences. Students can lead the discussion and explain to their family what they have learned by talking them through their portfolios.

Be certain that portfolios demonstrate students' growth.

Examples

1. Ask students to make a "history" of their progress along certain dimensions and to illustrate points in their growth with specific works.
2. Ask students to include descriptions of activities outside class that reflect the growth illustrated in the portfolio.

Teach students how to create and use portfolios.

Examples

1. Keep models of very well done portfolios as examples, but stress that each portfolio is an individual statement.
2. Examine your students' portfolios frequently, especially early in the year when they are just getting used to the idea. Give constructive feedback that provides explanations and information about better strategies and problem-solving approaches.

James Popham (2020) emphasizes that rubrics should be neither so specific that they apply to only one task nor so general that they give no useful guidance. For example:

- *Write a 400-word essay about home fire escape plans that includes the rationale provided by the firefighter who visited our class and the six elements of a good plan.* (Too specific—describes only one task and does not address the more general skill of writing essays.)
- *Essays will be judged poor, fair, good, or excellent.* (Too general—provides no more information than grading essays as D, C, B, or A.)

The *Guidelines: Developing a Rubric* on the next page give more ideas; some are taken from Johnson and Johnson (2002), Guskey (2020), and Popham (2020).

It is often helpful to have students join in the development of rating scales and scoring rubrics. When students participate, they are challenged to decide what quality work looks or sounds like in a particular area. They know in advance what is expected. As students gain practice in designing and applying scoring rubrics, their work and their learning often improve.

RELIABILITY AND VALIDITY. Because the teacher's personal judgment plays such a central role in evaluating performances, reliability is a concern. One teacher's "excellent" could be another teacher's "adequate." Research shows that when raters are experienced and scoring rubrics are well developed and refined, reliability may improve (Herman & Winters, 1994; LeMahieu et al., 1993).

Connect and Extend to PRAXIS II®

Scoring Rubrics (II, C3)

Kathy Schrock's Guide for Educators (http://www.schrockguide.net/assessment-and-rubrics.html) provides information about every aspect of the use of scoring rubrics in the classroom as well as an extensive collection of rubrics that can be used or adapted by teachers.

GUIDELINES

Developing a Rubric

1. *Make sure the skill to be assessed is important and can be taught.* It takes time to develop good rubrics, so make sure the skill being assessed is worth everyone's time and that the skill can be improved with instruction and practice.
2. *Look at models.* Show students examples of good and not-so-good work based on composites of work not linked to individual students. Identify the characteristics that make the good ones good and the bad ones bad.
3. *List criteria.* Use the discussion of models to begin a list of what counts in quality work.
4. *Articulate gradations of quality.* Describe the best and worst levels of quality; then fill in the middle levels based on your knowledge of common problems and the discussion of not-so-good work.
5. *Practice on models.* Have students use the rubrics to evaluate the models you gave them in Step 2.
6. *Use self- and peer assessment.* Give students their task. As they work, stop them occasionally for self- and peer assessment.
7. *Revise.* Always give students time to revise their work based on the feedback they get in Step 6.
8. *Use teacher assessment.* In your grading, be sure to use the same rubric students used to assess their work.

Note: Step 3 may be necessary only when you are asking students to engage in a task with which they are unfamiliar. Steps 5 and 6 are useful but time-consuming; you can do these on your own, especially when you've been using rubrics for a while. A class experienced in rubric-based assessment can streamline the process so that it begins with listing criteria, after which the teacher writes out the gradations of quality, checks them with the students, makes revisions, and then uses the rubric for self-, peer, and teacher assessment.

For a great explanation of using rubrics, see Mertler (2001), available at https://scholarworks.umass.edu/pare/vol7/iss1/25/. This online article includes several links that allow you to create and customize rubrics for your class, including http://rubistar.4teachers.org.

In terms of validity, some evidence shows that students who are classified as "master" writers on the basis of portfolio assessment are judged less capable using standard writing assessments. Which form of assessment is the best reflection of enduring qualities? It is hard to say. In addition, when rubrics are developed to assess specific tasks, the results of applying them may not predict performance on anything except very similar tasks, so we do not know whether a student's performance on a specific task is a valid indicator for the larger area of study (Haertel, 1999; McMillan, 2004).

DIVERSITY AND BIAS IN PERFORMANCE ASSESSMENT. Equity is an issue in all assessment and no less so with performances and portfolios. With a public performance, there could be bias effects based on a student's appearance and speech or the student's access to expensive audio, video, or graphic tools. Performance assessments have the same potential as other tests to discriminate unfairly against students who are not wealthy or who are culturally different. And the extensive group work, peer editing, and out-of-class time devoted to portfolios means that some students may have access to greater networks of support, technology, and outright help. Many students in your classes will come from families that have sophisticated tech devices and publishing capabilities. Others may have little support from home. These differences can be sources of bias and inequity, especially in portfolios and performances.

Assessing Complex Thinking

In order to develop complex thinking ability, we have to be able to assess it. The good news is that assessing complex thinking and higher-order outcomes actually can help students

master and retain core facts as well (Jensen et al., 2014). So you don't have to choose between testing facts and testing complex thinking.

Assessments of complex thinking don't have to be tests. Carol Lee and Susan Goldman (2015) have developed assessments of complex thinking in literacy that involve authentic reading and writing. For example, to assess middle and high school students' abilities to cite evidence in making claims about symbolism in the text, the students had to (a) put events in order from the reading to show they comprehended the plot, (b) use a graphic guide to organize claims and evidence they used to answer the question, and (c) write an essay in which they compared and contrasted two stories in relation to the generalizations of the author and the structure of the text. The two stories had the theme of coming of age and incorporated symbolism as a rhetorical tool. Students' essays were judged with a rubric that evaluated the quality of the claims, whether the evidence cited was supported by the texts, the ability to organize the essay around similarities and differences, and the general clarity of the writing. You can see that assessing complex thinking is demanding for both the students and the teacher!

Classroom Assessment: Lessons for Teachers

One major message in this cluster is the importance of correctly matching the type of assessment tools used with the target—the knowledge being assessed. Look at Table 15.3, which summarizes the possibilities and limitations of aligning different assessment tools with their targets.

The second lesson is, as you saw in the previous cluster and several others, feedback is critical for learning. The word "feedback" appears 46 times in this cluster and countless times throughout the book. Providing feedback to students is a key professional skill for

Table 15.3 Aligning Different Assessment Tools with Their Targets

Different Learning Objectives require different assessment methods.

	ASSESSMENT METHOD			
TARGET TO BE ASSESSED	**SELECTED-RESPONSE**	**ESSAY**	**PERFORMANCE ASSESSMENT**	**PERSONAL COMMUNICATION**
Knowledge Mastery	Multiple-choice, true/false, matching, and fill-in can sample mastery of elements of knowledge.	Essay exercises can tap understanding of relationships among elements of knowledge	Not a good choice for this target—three other options (selected-response, essay, personal communication) preferred	Can ask questions, evaluate answers, and infer mastery—but a time-consuming option
Reasoning Proficiency	Can assess understanding of basic patterns of reasoning	Written descriptions of complex problem solutions can provide a window into reasoning proficiency	Can watch students solve some problems and infer about reasoning proficiency	Can ask student to "think aloud" or can ask follow-up questions to probe reasoning
Skills	Can assess mastery of the prerequisites of skillful performance—but cannot tap the skill itself	Can assess mastery of the prerequisites of skillful performance—but cannot tap the skill itself	Can observe and evaluate skills as they are being performed	Strong match when skill is oral communication proficiency; also can assess mastery of knowledge prerequisite to skillful performance
Ability to Create Products	Can assess mastery of knowledge prerequisite to the ability to create quality products—but cannot assess the quality of products themselves	Can assess mastery of knowledge prerequisite to the ability to create quality products—but cannot assess the quality of products themselves	A strong match can assess: (a) proficiency in carrying out steps in product development and (b) attributes of the product itself	Can probe procedural knowledge and knowledge of attributes of quality products—but not product quality

Source: From "Where Is Our Assessment Future and How Can We Get There?" by R. J. Stiggins. In R. W. Lissitz, W. D. Schafer (Eds.), *Meaningful Assessment: A Manageable and Cooperative Process*. Published by Allyn & Bacon. Copyright © 2002 by Pearson Education. Adapted by permission of the publisher.

teachers and one of the most powerful influences on student learning (Hattie, 2009; Schuldt, 2019). What makes feedback valuable? Don't just provide right answers. Give explanations about why the right answer is correct and the wrong answer isn't. In learning concepts, give additional correct examples of the concept. Discuss better learning strategies. To make sure students understand and value the feedback, have a conversation with the students *about* the feedback—don't just write or say the feedback and assume it was heard. You might even encourage the students to write the feedback down and review it later. Encourage students to identify three strengths, three areas for improvement, and an action plan to use the feedback to get better. Finally, give feedback in a way that communicates that the students are getting better and are worth the effort to improve—support their self-efficacy for learning and improving (Finn et al., 2018; van der Kleij, 2019). In sum, Lorien Schuldt (2019) notes that feedback should:

- Focus on the task and the student's progress toward the goal, not on the student as a person or on comparisons with other students.
- Provide information about what to do next—how to close the gap between "where I am" and "where I'm going."
- Be constructive and highlight strengths as well as paths to improvement.
- Be timely, that is, come at a time when students can act on the guidance to improve.
- Foster student agency and ownership of the work.

No matter how you assess students, ultimately you will assign grades. We turn to that job next.

Grading

Gia, a 10th-year visual arts teacher, said: "I don't think any teacher likes grading. It's time consuming. Assessing the work isn't much fun. Developing good lessons and teaching well are a lot more fun" (Olsen & Buchanan, 2019, p. 2004). The teachers I know would agree.

Grading is one of those school practices that has hardly changed over the years. Teachers often grade the way they do because that's the way it has always been done (Guskey, 2020). So why grade? Although some people claim that the purpose of grading is to sort students or motivate them to work, the best reason (maybe the only legitimate reason) is to communicate to the students and their families how the students are progressing toward important learning goals. In fact, Tom Guskey, a world-renowned expert on grading, notes two essential consequences of grades that *must be changed*;

1. We must help students and their families understand that grades reflect not *who* students are as learners but *where* they are in their learning journey—and where is always temporary.
2. We must never use grades to sort, select, or rank students (p. 14).

Simply put, grades should answer the question students always ask, "How am I doing?" The challenge is to combine a vast amount of information about an individual into a symbol or other indicator that communicates "how you're doing" (Hübner et al., 2020). First, the teacher must make a major decision: Should a student's grade reflect his or her status in comparison with the rest of the class, or should the grade reflect the amount of material learned and how well it has been learned? In other words, should grading be *norm referenced* or *criterion referenced*?

Norm-Referenced Versus Criterion-Referenced Grading

Norm-referenced grading
In determining grades, assessing students' achievement in relation to one another.

In **norm-referenced grading**, the major influence on a grade is the student's standing in comparison with others who also took the course. If a student studies very hard and almost everyone else does too, the student may receive a disappointing grade, perhaps a C

Grading on the curve
Norm-referenced grading that compares students' performance to an average level.

or D. One common type of norm-referenced grading is called **grading on the curve**. How you feel about this approach probably depends on where your grades generally fall along that "curve," but this approach certainly violates Guskey's (2020) caution about using grades to sort, select, or rank students. When you think about it, if the curve arbitrarily limits the number of good grades that can be given, then, in the game of grading, most students will be losers and motivation will suffer (Guskey & Bailey, 2001; Haladyna, 2002; Kohn, 1996). Tom Guskey (2011) pointed out the fallacy of grading on the curve: "The normal bell-shaped curve describes the distribution of randomly occurring events *when nothing intervenes*" (p. 17). But teaching is intervening—we want to teach in such a way that all students learn. Finally, grading on the curve really does not communicate what the student knows or can do, which is the main reason for grading in the first place. For this purpose, we need criterion-referenced grading.

Criterion-referenced grading
Assessment of each student's mastery of course objectives.

In **criterion-referenced grading**, the grade represents a list of accomplishments. If clear learning targets have been set for the course, the grade may represent a certain number of targets reached satisfactorily. When a criterion-referenced system is used, criteria for each grade generally are spelled out in advance. It is then up to the student to earn the grade she or he wants to receive. Theoretically, in this system, all students can achieve an A if they reach the criteria. Criterion-referenced grading has the advantage of relating judgments about a student to the achievement of clearly defined instructional goals or standards. Some school districts have developed reporting systems in which report cards list learning targets along with judgments about the student's attainment of each target. Reporting is done at the end of each unit of instruction. The elementary school report card shown in Figure 15.2 demonstrates the relationship between assessment and the goals of the unit.

Most schools have a specified grading system, so we won't spend time here on the many possible systems, except to say that if your school is trying to improve its grading systems, from teacher gradebooks to report cards to permanent records and transcripts, the best resource is the carefully researched and clearly written book *Get Set, Go: Creating Successful Grading and Reporting Systems* (2020) by Thomas Guskey.

Let's consider an important question about any grading system: What are the effects of grades on students?

Effects of Grading on Students

How do you feel about grades?

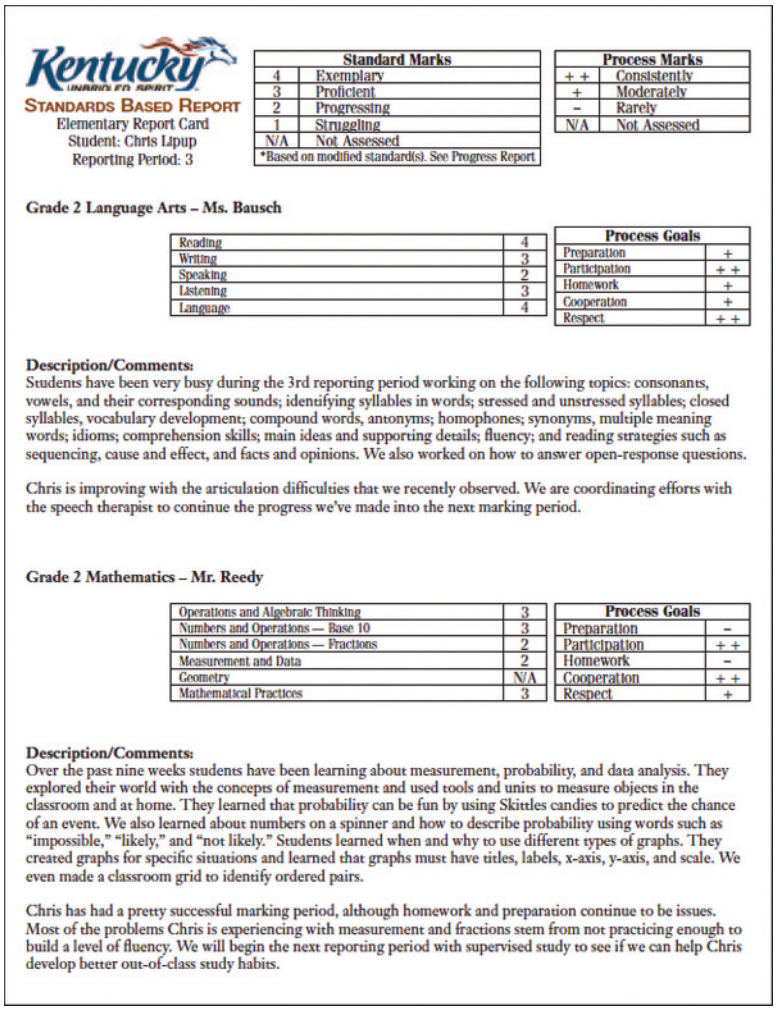
Stop & Think Think back on your report cards and grades over the years. Did you ever receive a grade that was lower than you expected? How did you feel about yourself, the teacher, the subject, and school in general as a result of the lower grade? What could the teacher have done to help you understand and profit from the experience?

When we think of grades, we often think of competition. Highly competitive classes may be particularly hard on anxious students, students who lack self-confidence, students who are less prepared, and students who are learning English. Although high standards do tend to be generally related to increased academic learning, it is clear that teachers must strike a balance between high standards and a reasonable chance to succeed. High standards without a way to reach them is simply cruel punishment. So should low grades and failure be avoided in school? The situation is not that simple.

THE VALUE OF FAILING? Humans generally avoid making errors. "However, a growing body of research in cognitive and educational psychology has established that errors in low-stakes contexts enhance learning when they are followed by corrective feedback" (Wong & Lim, 2019). Feedback—there is that word again. One way to encourage critical thinking and support development of robust knowledge is to ask students questions that push their understanding and even draw out mistakes or errors and then

Figure 15.2 A Criterion-Referenced Report Card

This is one example of a criterion-referenced report card. Other forms are possible, but all criterion-referenced reports indicate student progress toward specific goals.



Kentucky
UNBRIDLED SPIRIT

STANDARDS BASED REPORT
Elementary Report Card
Student: Chris Lipup
Reporting Period: 3

Standard Marks	
4	Exemplary
3	Proficient
2	Progressing
1	Struggling
N/A	Not Assessed

*Based on modified standard(s). See Progress Report

Process Marks	
+ +	Consistently
+	Moderately
–	Rarely
N/A	Not Assessed

Grade 2 Language Arts – Ms. Bausch

Reading	4
Writing	3
Speaking	2
Listening	3
Language	4

Process Goals	
Preparation	+
Participation	+ +
Homework	+
Cooperation	+
Respect	+ +

Description/Comments:
Students have been very busy during the 3rd reporting period working on the following topics: consonants, vowels, and their corresponding sounds; identifying syllables in words; stressed and unstressed syllables; closed syllables, vocabulary development; compound words, antonyms; homophones; synonyms, multiple meaning words; idioms; comprehension skills; main ideas and supporting details; fluency; and reading strategies such as sequencing, cause and effect, and facts and opinions. We also worked on how to answer open-response questions.

Chris is improving with the articulation difficulties that we recently observed. We are coordinating efforts with the speech therapist to continue the progress we've made into the next marking period.

Grade 2 Mathematics – Mr. Reedy

Operations and Algebraic Thinking	3
Numbers and Operations — Base 10	3
Numbers and Operations — Fractions	2
Measurement and Data	2
Geometry	N/A
Mathematical Practices	3

Process Goals	
Preparation	–
Participation	+ +
Homework	–
Cooperation	+ +
Respect	+

Description/Comments:
Over the past nine weeks students have been learning about measurement, probability, and data analysis. They explored their world with the concepts of measurement and used tools and units to measure objects in the classroom and at home. They learned that probability can be fun by using Skittles candies to predict the chance of an event. We also learned about numbers on a spinner and how to describe probability using words such as "impossible," "likely," and "not likely." Students learned when and why to use different types of graphs. They created graphs for specific situations and learned that graphs must have titles, labels, x-axis, y-axis, and scale. We even made a classroom grid to identify ordered pairs.

Chris has had a pretty successful marking period, although homework and preparation continue to be issues. Most of the problems Chris is experiencing with measurement and fractions stem from not practicing enough to build a level of fluency. We will begin the next reporting period with supervised study to see if we can help Chris develop better out-of-class study habits.

Source: Guskey, T. R., Swan, G. M., & Jung, L. A. (2011). Grades that mean something. *Phi Delta Kappan, 93*(2), p. 53. Used with permission.

provide clear feedback with reteaching and the chance to improve (Guskey, 2020). For this to work, the class must be a safe place that supports taking risks and making errors so error correction is possible and valued. And the level of difficulty must be just right—not so hard that students just give up. Also, teachers can describe common errors and explain why they are wrong and why the right answers are right (Wong & Lim, 2019). Failure also can support persistence and motivation, especially if teachers help the students see connections between hard work and improvement. Efforts to protect students from failure and guarantee success may be counterproductive, especially if students come to feel entitled to high grades without exerting much effort—a bad life lesson (Tomlinson, 2005b).

RETENTION IN GRADE. What about the effect of failing an entire grade—that is, of being "held back"? Retained children are more likely to be male, members of minority groups, living in poverty, younger, and less likely to have participated in early childhood programs (Beebe-Frankenberger et al., 2004; G. Hong & Raudenbush, 2005). Is retention a good policy? See the *Point/Counterpoint* to examine the issue.

POINT/COUNTERPOINT: Should Children Be Held Back?

In 2017, about 1,082,000 students (kindergarten through grade 12) were retained in grade (Digest of Educational Statistics, 2020). For the last 100 years, parents and educators have debated about the value of retention versus *social promotion* (passing students on to the next grade with their peers). What are the arguments and the evidence?

Point

Yes, retention just makes sense. The traditional arguments for retention include that classes will be more similar in achievement level if the low-achieving students are "held back," so teaching will be easier for the teacher and can be at a higher level for the students in the class. Also, learning with younger classmates may be more developmentally appropriate for the lower-achieving students and could motivate them to work harder (Hong & Raudenbush, 2005). One study in Florida found that students retained in third grade based on reading proficiency test scores had to take fewer remedial courses in high school and were just as likely to graduate as students not retained (Schwerdt et al., 2015, 2017). Critics of the study noted, however, that retained students all received intensive extra services intended to raise reading achievement, so those additional supports may have made the difference and not the actual repeating of third grade (Robinson-Cimpian, 2015).

Retention in kindergarten for children considered "not ready" for first grade is a common practice. Compared with students who are relatively younger (January to August birthdays), students who are relatively older (born September to November) have higher achievement in school on average (Cobley et al., 2009). In fact, some parents hold their son or daughter back to give the child an edge over peers in each grade thereafter or because the child was born late in the year—a practice sometimes called "academic red-shirting" (Wallace, 2014). About 4% to 5.5% of children delay entry to kindergarten. The most likely to be red-shirted are White, male, and high-SES children. Schools that serve those populations have higher rates of school delay (Bassok & Reardon, 2013). The results on academic red-shirting are mixed. Some studies have found benefits for students who have been held back by their parents, but other studies have found no benefits

Counterpoint

No, retention is not effective. Even though a few studies support the value of retention (e.g., Marsh, 2016; Schwerdt et al., 2015, 2017), almost a century of research indicates that it is not helpful and may even be harmful. Most research finds that grade retention is associated with poor long-term outcomes such as dropping out of school, higher arrest rates, fewer job opportunities, and lower self-esteem (Andrews, 2014; Jimerson et al., 2002; Jimerson & Ferguson, 2007; Shepard & Smith, 1989). Lucy Barnard-Brak (2008) studied a national sample of 986 children who had been identified as having learning disabilities and concluded that "delayed kindergarten entrance was not associated with better academic achievement for children with learning disabilities across time" (p. 50).

Even though G. Hong and Raudenbush (2005) acknowledged the arguments for retention (see the Point section), their extensive study that followed almost 12,000 kindergarten students through the end of first grade found just the opposite. The researchers compared retained and promoted students from schools that practice retention as well as promoted students from schools that practice social promotion. They found no evidence that retention improved either reading or mathematics achievement. In addition, retention did not seem to improve instruction in the first grade by making the class more similar in academic ability. After 1 year, the retained students were an average of 1 year behind, and evidence indicated that these children would have done better if promoted. Another study that followed retained and promoted students for 4 years found

some short-term advantages for retained students in social and behavioral skills, followed by long-term problems and vulnerabilities. The authors suggest that the "struggle-succeed-struggle" pattern may undermine academic motivation for retained students and interfere with peer relations (Demanet & Van Houtte, 2016; Wu et al., 2010). Jan Hughes and her colleagues (2018) followed students for years who were retained in grades 1 through 5 and found that being held back led to a significant increase in dropping out of school, especially for Black and Hispanic girls. And the negative impact may not be limited to the retained student. In one study of over 79,000 students, seventh-graders who simply attended school with many peers who were old for their grade (because they had been retained or "red-shirted") were more likely to get in trouble at school or be suspended (Muschkin et al., 2014).

Beware of Either/Or

Using Research for Children. No matter what, children who are having trouble should get help, whether they are promoted or retained. However, just covering the same material again in the same way won't solve the children's academic or social problems. The best approach may be to promote the children along with their peers but to give them special remediation during the summer or over the next year (Demanet & Van Houtte, 2016). In addition, because the inability to focus attention and self-regulate is an important aspect of readiness to learn (Blair, 2002), help should also focus on improving these skills as well. An even better approach would be to prevent the problems before they occur by providing extra resources in the early years.

Grades and Motivation

The assessments you give should support students' motivation to learn—not their motivation to work for a good grade. But is there really a difference between working for a grade and working to learn? The answer depends in part on how a grade is determined. If you test only at a simple but detailed level of knowledge, you may force students to choose between complex learning and a good grade. But when a grade reflects meaningful learning and learning is supported by formative assessments with useful feedback, working for a grade and working to learn become the same thing. Today there is increasing discussion of grading *for* learning, not just grading *of* learning—the same distinction made between formative and summative assessment. If teachers grade in the best interests of their students and talk to students about how to interpret and learn from the grades as feedback, then grades might support motivation to learn (McMillan, 2019).

Low grades by themselves generally do not encourage greater efforts, however. Students receiving low grades are more likely to withdraw, blame others, decide that the work is "dumb," or feel responsible for the low grade but helpless to make improvements. They give up on themselves or on school. In fact, low grades at the beginning of the year may set up a downward spiral: lower grades, less engagement in schoolwork, lower grades, less engagement, and on and on (Poorthuis et al., 2015; Tomlinson, 2005b). Rather than assigning a failing grade, you might consider the work incomplete and give students support in revising or improving it. Maintain high standards and give students a chance to reach them. Again, formative assessment and quality feedback are key (Guskey, 2011, 2018; Polio & Hochbein, 2015).

The *Guidelines: Using Any Grading System* give ideas for fair and reasonable use of any grading system.

Beyond Grading: Communicating with Families

No number or letter grade conveys the totality of a student's experience in a class or course. Students, families, and teachers sometimes become too focused on the end point—the grade. But communicating with families should involve more than just sending home grades. There are a number of ways to be in touch with and report to families. Many teachers I know have a

GUIDELINES

Using Any Grading System

Explain your grading policies to students early in the course and remind them of the policies regularly.

Examples

1. Give older students a handout describing the assignments, tests, grading criteria, and schedule.
2. Explain to younger students in a low-pressure manner how their work will be evaluated.

Base grades on clearly specified, reasonable standards.

Examples

1. Specify standards by developing a rubric with students. Show anonymous examples of poor, good, and excellent work from previous classes.
2. Discuss workload and grading standards with more experienced teachers.
3. Give a few formative tests to get a sense of your students' abilities before you give a graded test.
4. Take tests yourself first to gauge the difficulty of the test and to estimate the time your students will need.

Base your grades on as much objective evidence as possible.

Examples

1. Plan in advance how and when you will test.
2. Keep a portfolio of student work. This may be useful in student or parent conferences.

Be sure students understand test directions.

Examples

1. Outline the directions on the board.
2. Ask several students to explain the directions.
3. Go over a sample question first.

Correct, return, and discuss tests as soon as possible.

Examples

1. Have students who wrote good answers read their responses for the class; make sure they are not the same students each time.
2. Discuss why wrong answers, especially popular wrong choices, are incorrect.
3. As soon as students finish a test, give them the answers to questions and the page numbers where answers are discussed in the text.

As a rule, do not change a grade.

Examples

1. Make sure you can defend the grade in the first place.
2. DO change any clerical or calculation errors.

Guard against bias in grading.

Examples

1. Ask students to put their names on the backs of their papers.
2. Use a point system or model papers when grading essays.

Keep pupils informed of their standing in the class.

Examples

1. Write the distribution of scores on the board after tests.
2. Schedule periodic conferences to go over work from previous weeks.

Give students the benefit of the doubt. All measurement techniques involve error.

Examples

1. Unless there is a very good reason not to, give the higher grade in borderline cases.
2. If a large number of students miss the same question in the same way, revise the question for the future and consider throwing it out for that test.

Avoid reserving high grades and high praise for answers that conform to your ideas or to those in the textbook.

Examples

1. Give extra points for correct and creative answers.
2. Withhold your opinions until all sides of an issue have been explored.
3. Reinforce students for disagreeing in a rational, productive manner.
4. Give partial credit for partially correct answers.

Make sure each student has a reasonable chance to succeed, especially at the beginning of a new task.

Examples

1. Pretest students to make sure they have prerequisite abilities.
2. When appropriate, provide opportunities for students to take a retest to raise their grades, but make sure the retest is as difficult as the original.
3. Consider failing efforts as "incomplete," and encourage students to revise and improve.
4. Base grades more on work at the end of the unit; give ungraded work in the beginning of the unit.

Balance written and oral feedback.

Examples

1. Consider giving short, lively written comments with younger students and more extensive written comments with older students.
2. When the grade on a paper is lower than the student might have expected, be sure the reason for the lower grade is clear.
3. Tailor comments to the individual student's performance; avoid writing the same phrases over and over.
4. Note specific errors, possible reasons for errors, ideas for improvement, and work done well.
5. Students often don't read or misinterpret written feedback. Periodically have individual conferences and give constructive feedback—strengths and areas for improvement.

Make grades as meaningful as possible.

Examples

1. Tie grades to the mastery of important learning targets.
2. Give ungraded assignments to encourage exploration.
3. Experiment with performances and portfolios.

Base grades on more than just one criterion.

Examples

1. Use essay questions as well as multiple-choice items on a test.
2. Grade oral reports and class participation.

Source: General conferencing guidelines adapted from *Problems in middle and high school teaching: A handbook for student teachers and beginning teachers* (pp. 182–187), by A. M. Drayer, 1979. Allyn & Bacon. Copyright © 1979 by Allyn & Bacon. Adapted by permission of the author and publisher.

beginning-of-the-year newsletter or student handbook that communicates homework, behavior, and grading policies to families. Other options described by Guskey and Bailey (2001) are:

- Notes attached to report cards
- "Happy notes" sent home describing a good moment or accomplishment
- Phone calls, especially "Good News" calls
- School open houses
- Student-led conferences
- Portfolios or exhibits of student work
- Homework hotlines

- School or class web pages
- Home visits

Conferences with parents or caregivers are often expected of teachers in elementary school and can be equally important in middle and high school. You already have some ideas about productive conferences in the *Family and Community Partnership Guidelines* in Cluster 5 (pp. 211–212), in the section on student-led conferences in Cluster 6 (pp. 280–281), and coming up in the *Family and Community Partnerships Guidelines* about explaining test results on page 687. In addition, the more skilled teachers are at communicating, the more effective they will be at conducting these conferences. Listening and problem-solving skills such as those discussed in Cluster 13 can be particularly important. When you are working with families or students who are angry or upset, make sure you really hear their concerns, not just their words. The atmosphere should be friendly and unrushed. Any observations about the student should be as factual as possible, based on observation or information from assignments. Information gained from a student or a parent/caregiver should be kept confidential.

One kind of information that will interest parents is their child's standardized test scores. In the next section we look at these tests.

Module 46 Summary

Formative and Authentic Classroom Assessments (pp. 665–673)

How can teachers use formative assessment? Formative assessments may be informal and "on the fly," such as exit tickets or journals, or formal assessments, such as quizzes embedded in the curriculum. Whatever the form, students can participate in the formative assessment by analyzing their work and making plans for improvement.

What is authentic assessment? Critics of traditional testing believe that teachers should use authentic tests and other authentic assessment procedures. Authentic assessment requires students to perform tasks and solve problems that are similar to the real-life performances that will be expected of them outside of school.

Describe portfolios. Portfolios are examples of authentic assessment. A portfolio is a collection of a student's work, sometimes chosen to represent growth or improvement or sometimes featuring "best work." Portfolios may be produced by individuals or cooperative groups.

What are the issues of reliability, validity, and equity with portfolios and performance assessment? Using authentic assessments does not guarantee reliability, validity, and equity (absence of bias). Using rubrics is one way to make assessment more reliable and valid. But the results from assessment based on rubrics may not predict performance on related tasks. Also, rater bias based on the appearance, speech, or behavior of students or a lack of resources may place students from minority groups at a disadvantage in performance assessments or projects.

Why assess complex thinking? Assessing complex thinking and higher-order outcomes actually can help students master and retain core facts as well. In other words, testing for complex understanding improves learning at all the levels of Bloom's taxonomy, from remembering factual knowledge to analyzing and creating high-level knowledge. There are approaches in each subject that assess students' abilities to analyze, apply, evaluate, and create.

Grading (pp. 673–680)

Describe two kinds of grading. Grading can be either norm referenced or criterion referenced. One popular norm-referenced system is grading on the curve, based on a ranking of students in relation to the average performance level. This is not recommended. Criterion-referenced report cards usually indicate how well the individual student has met each of several learning goals.

How can failure support learning? Students need experience in coping with failure, so standards must be high enough to encourage effort. Occasional failure can be positive if appropriate feedback is provided. Making errors in low-stakes contexts can enhance learning if students get quality corrective feedback. Students who never learn how to cope with failure may give up quickly when their first efforts are unsuccessful.

Which is better, "social promotion" or being "held back"? Simply retaining or promoting a student who is having difficulty will not guarantee that the student will learn. Unless the student is very young or emotionally immature compared to others in the class, the best approach may be to promote, but provide extra support such as tutoring or summer school sessions. Differentiated instruction could prevent problems.

Can grades promote learning and motivation? Learning is increased by written or oral feedback that includes specific comments on errors or faulty strategies, but that balances this criticism with suggestions about how to improve—along with comments on the positive aspects of the work. Grades can encourage students' motivation to learn if they are tied to meaningful learning.

How can communications with families support learning? Not every communication from the teacher needs to be tied to a grade. Communication with students and families can be important in helping a teacher understand students and present effective instruction by creating a consistent learning environment. Students and families have a legal right to see all the information in the students' records, so the contents of files must be appropriate, accurate, and supported by evidence.

MODULE 47 Standardized Testing and Teacher Evaluation

Learning Objective 15.5 Explain how to interpret common standardized test scores (percentile rank, stanine, grade-equivalent, scale score) as well as current issues and criticisms concerning accountability and teacher evaluation, high-stakes assessment, growth versus proficiency tests, and value-added approaches.

Standardized Testing

For as long as I can remember, educators and policymakers have been concerned about the test performance of American students. Today, politicians point to the Trends in International Mathematics and Science Study (TIMSS) (Mullis et al., 2020) showing that the United States is still behind many other developed countries in math and science test scores. In response, there has been *more* testing at every grade, so you must be knowledgeable. Understanding what standardized test scores really mean and how they can be used (or misused) is a good start.

Connect and Extend to PRAXIS II®

Concepts of Standardized Testing (II, C5)

Be able to define norm groups, measures of central tendency, standard deviation, normal distribution, reliability, and validity and to explain their roles in standardized tests.

Types of Scores

Put Yourself in Their Place At your first parent conference, a mother and father are concerned about their child's percentile rank of 86. They say that they expect their child to "get close to 100%. We know she should be able to do that because her grade-equivalent score is half a year above her grade!" Do they understand the meaning of these scores?

To understand the scores from tests, you need to know some basics about different types of scores and what they tell you, but first you need to know some (easy) statistics.

MEASUREMENTS OF CENTRAL TENDENCY AND STANDARD DEVIATION. You have probably had a great deal of experience with means. A **mean** is simply the arithmetical average of a group of scores. To calculate the mean, you add the scores and divide the total by the number of scores in the distribution. The mean offers one way of measuring **central tendency**, the score that is typical or representative of the whole group of scores. But very high or very low scores affect the mean, so when there are a few very high or low scores, the median may be better than the mean to represent central tendency. The **median** is the middle score in a ranked list of scores, the point at which half the scores are larger and half are smaller. The **mode** is the score that occurs most often.

Mean
Arithmetical average.

Central tendency
Typical score for a group of scores.

Median
Middle score in a group of scores.

Mode
Most frequently occurring score.

The measure of central tendency gives a score that is representative of the group of scores, but it does not tell you anything about how the scores are distributed. Two groups of scores may both have a mean of 50 but be alike in no other way. One group might contain the scores 50, 45, 55, 55, 45, 50, 50; the other group might contain the scores 100, 0, 50, 90, 10, 50, 50. In both cases, the mean, median, and mode are all 50, but the distributions are quite different.

Standard deviation
Measure of how widely scores vary from the mean.

The **standard deviation** is a measure of how widely the scores vary from the mean. The larger the standard deviation, the more spread out the scores are in the distribution. The smaller the standard deviation, the more the scores are clustered around the mean. For example, in the distribution 50, 45, 55, 55, 45, 50, 50, the standard deviation is much smaller than in the distribution 100, 0, 50, 90, 10, 50, 50. Another way of saying this is that distributions with very small standard deviations have less **variability** in the scores.

Variability
Degree of difference or deviation from mean.

Knowing the mean and the standard deviation of a group of scores gives you a better picture of the meaning of an individual score. For example, suppose you received a score of 78 on a test. You would be very pleased with the score if the mean of the test were 70 and the standard deviation were 4. In this case, your score would be 2 standard deviations above the mean, a score well above average.

Consider the difference if the mean of the test had remained at 70 but the standard deviation had been 20. In the second case, your score of 78 would be less than 1 standard deviation from the mean. You would be much closer to the middle of the group, with a score above average but not high. Knowing the standard deviation tells you much more than simply knowing the **range** of scores. No matter how the majority scored on the tests, one or two students may do very well or very poorly and thus make the range very large.

Range
Distance between the highest and the lowest scores in a group.

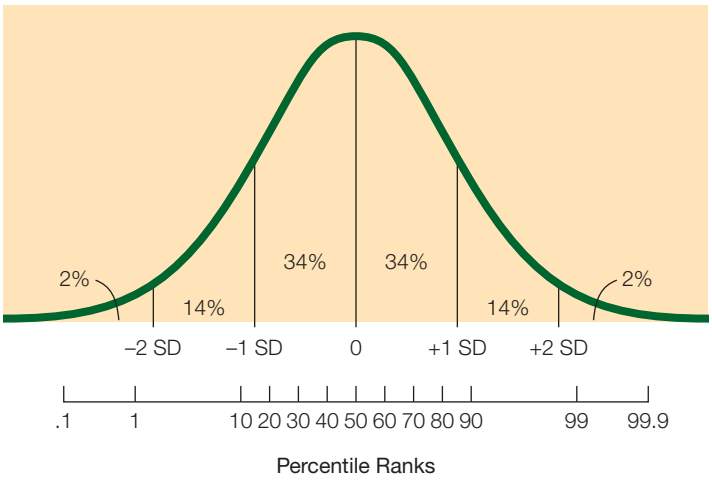
THE NORMAL DISTRIBUTION. Standard deviations are very useful in understanding test results. They are especially helpful if the results of the tests form a **normal distribution**. You may have encountered the normal distribution before. It is the bell-shaped curve, the most famous frequency distribution because it describes many naturally occurring physical and social phenomena. Many scores fall in the middle, giving the curve its bell appearance. You find fewer and fewer scores as you look out toward the end points, or *tails*, of the distribution. The normal distribution has been thoroughly analyzed by statisticians. The mean of a normal distribution is also its midpoint. Half the scores are above the mean, and half are below it. In a normal distribution, the mean, median, and mode are all the same point.

Normal distribution
The most commonly occurring distribution, in which scores are distributed evenly around the mean.

Another convenient property of the normal distribution is that the percentage of scores falling within each area of the curve is known, as you can see in Figure 15.3.

Figure 15.3 The Normal Distribution

The normal distribution, or bell-shaped curve, has certain predictable characteristics. For example, 68% of the scores are clustered within 1 standard deviation below to 1 standard deviation above the mean.



A person scoring within 1 standard deviation of the mean obviously has company. Many scores pile up here. In fact, 68% of all scores are located in the area from 1 standard deviation below to 1 standard deviation above the mean. About 16% of the scores are higher than 1 standard deviation above the mean. Of this higher group, only 2% are higher than 2 standard deviations above the mean. Similarly, only about 16% of the scores are less than 1 standard deviation below the mean, and of that group only about 2% are lower than 2 standard deviations below the mean. At 2 standard deviations from the mean in either direction, the scorer has left the pack.

The SAT college entrance exam is one example of a normal distribution. The mean of the Math section is about 500 with a standard deviation of 100, though in 2020, the actual mean was 523 and the standard deviation was 117 (College Board, 2020). So, because only 16% of the scores are higher than 1 standard deviation above the mean in a normal distribution, only about 16% of the people who took the Math test scored above 640 (523 + 117 = 640).

Now we are ready to look at different kinds of test scores.

PERCENTILE RANK SCORES. Ranking is the basis for one very useful kind of score reported on standardized tests, a **percentile rank** score. In percentile ranking, each student's *raw score* (actual number correct) is compared with the raw scores of the students in the *norm group* (comparison group). The percentile rank shows the percentage of students in the norm group that scored below a particular raw score. If a student's score were better than three-quarters of the students in the norm group, the student would score in the *75th percentile* or have a percentile rank of 75. You can see that this does not mean that the student had a raw score of 75 correct answers or even that the student answered 75% of the questions correctly. Rather, the 75 refers to the percentage of people in the norm group whose scores on the test were below this student's score. A percentile rank of 50 means that a student has scored better than 50% of the norm group and has achieved an average score.

Percentile rank
Percentage of those in the norming sample who scored below an individual's score.

There is one caution in interpreting percentile scores. Differences in percentile ranks do not mean the same thing in terms of raw score points in the middle of the scale as they do at the fringes. For example, the difference between the 50th and 60th percentile might be just 2 raw points, whereas the difference on the same test between the 90th and 99th percentile could be about 10 points. So a few answers right or wrong can make a bigger difference in percentile scores if you are near the middle.

GRADE-EQUIVALENT SCORES. **Grade-equivalent scores** are generally obtained from separate norm groups for each grade level. The average of the scores of all the 10th-graders in the norm group defines the 10th-grade–equivalent score. Suppose the raw-score average of the 10th-grade norm group is 38. Any student who attains a raw score of 38 on that test will be assigned a grade-equivalent score of 10th grade. Grade-equivalent scores are generally listed in numbers such as 8.3, 4.5, 7.6, 11.5, and so on. The whole number gives the grade. The decimals stand for tenths of a year, but they are usually interpreted as months.

Grade-equivalent score
Measure of grade level based on comparison with norming samples from each grade.

Suppose a student with the grade-equivalent score of 10 is a seventh-grader. Should this student be promoted immediately? Probably not. Different forms of tests are used at different grade levels, so the seventh-grader may not have had to answer items that would be given to 10th-graders. The high score may represent superior mastery of material at the seventh-grade level rather than a capacity for doing advanced work. Even though an average 10th-grader could do as well as our seventh-grader on this particular test, the 10th-grader would certainly know much more than this seventh-grade test covered. Also, grade-equivalent score units do not mean the same thing at every grade level. For example, a second-grader reading at the first-grade level would have more trouble in school than an 11th-grader who reads at the 10th-grade level.

Because grade-equivalent scores are misleading and are often misinterpreted, especially by parents, most educators and psychologists strongly believe *they should not be used at all*. Several other forms of reporting are more appropriate.

STANDARD SCORES. As you may remember, one problem with percentile ranks is the difficulty in making comparisons among ranks. A discrepancy of a certain number of raw-score

points has a different meaning at different places on the scale. With standard scores, on the other hand, a difference of 10 points is the same everywhere on the scale.

Standard scores
Scores based on the standard deviation.

Standard scores are based on the standard deviation. A very common standard score is called the ***z* score**. A *z* score tells how many standard deviations above or below the average a raw score is. In the example described earlier, in which you were fortunate enough to get a 78 on a test where the mean was 70 and the standard deviation was 4, your *z* score would be +2, or 2 standard deviations above the mean. If a person were to score 64 on this test, the score would be 1.5 standard deviations below the mean, and the *z* score would be −1.5. A *z* score of 0 would be no standard deviations above the mean—in other words, right on the mean. Measurements similar to *z* scores are used when you take a bone density test. Your score will compare your bone density to that of a healthy 30-year-old. If your score is below −1, you are moving toward osteoporosis. Below −2, you are there. Because it is often inconvenient to use negative numbers, other standard scores have been devised to eliminate this difficulty. The ***T* score** has a mean of 50 and uses a standard deviation of 10. Thus, a *T* score of 50 indicates average performance. If you multiply the *z* score by 10 (which eliminates the decimal) and add 50 (which gets rid of the negative number), you get the equivalent *T* score as the answer. The person whose *z* score was −1.5 would have a ***T*** score of 35.

z score
Standard score indicating the number of standard deviations above or below the mean that a particular score falls.

T score
Standard score with a mean of 50 and a standard deviation of 10.

$$\text{First multiply the } z \text{ score by 10: } -1.5 - 10 = -15$$

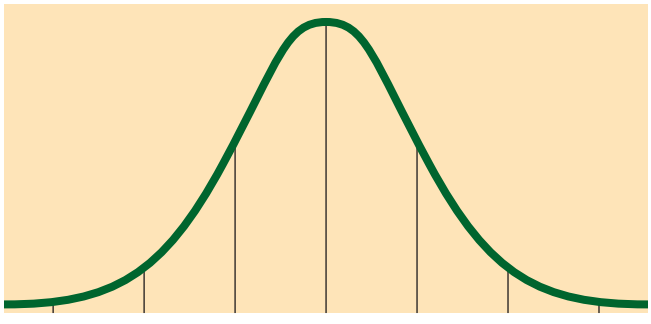
$$\text{Then add 50: } -15 + 50 = 35$$

Before we leave this discussion of types of scores, we should look at one other widely used method. **Stanine scores** (the name comes from "standard nine") are standard scores. There are only nine possible scores on the stanine scale, the whole numbers 1 through 9. The mean is 5, and the standard deviation is 2. Stanine scores provide a method of considering a student's rank because each of the nine scores includes a specific range of percentile scores in the normal distribution. For example, a stanine score of 1 is assigned to the bottom 4% of scores in a distribution. A stanine of 2 is assigned to the next 7%. Of course, some raw scores in this 7% range are better than others, but they all get a stanine score of 2.

Stanine scores
Whole-number scores from 1 to 9, each representing a wide range of raw scores.

Each stanine score represents a wide range of raw scores. This has the advantage of encouraging teachers and parents to view a student's score in more general terms instead of making fine distinctions based on a few points. Figure 15.4 compares the four types of standard scores we have considered, showing how each would fall on a normal distribution curve.

Figure 15.4 Three Types of Standard Scores on a Normal Distribution Curve
Using this figure, you can translate one type of standard into another.



Standard deviation	−3 SD	−2 SD	−1 SD	0 (Mean)	+1 SD	+2 SD	+3 SD
z scores	−3	−2	−1	0	+1	+2	+3
T scores	20	30	40	50	60	70	80
SAT scores	200	300	400	500	600	700	800
Stanine scores		1	2	3	4	5	6	7	8	9	

Interpreting Standardized Test Reports

Stop & Think Look at the test printout in Figure 15.5. What are this student's strengths and weaknesses? How do you know?

What specific information can teachers expect from achievement test results? Test publishers usually provide individual profiles for each student, showing scores on each subtest. Figure 15.5 is an example of a Student Report for Sally, a fourth-grader, on the Stanford Achievement Test, 10th Edition. Note that the Student Report has three sections. The first (About This Student's Performance) is a brief narrative explanation that may include a Lexile Measure™ (see http://lexile.com), which is computed from the Reading Comprehension score and helps teachers identify Sally's reading level in order to select appropriate texts.

The second section (Subtests and Totals) attempts to paint a picture of the student's achievement in Reading, Mathematics, Language, Spelling, Science, Social Science, Listening, *and* Thinking Skills. That section also includes total scores on the battery of tests and scores on the Otis-Lennon School Ability test—a kind of group IQ or scholastic aptitude test. Some of the subtests are further divided into more specific assessments. For example, Reading is broken down into Word Study Skills, Reading Vocabulary, and Reading Comprehension. Next to each subtest are several different ways of reporting Sally's score. The school decides which scores are reported based on a list of possible reporting formats. This school chose the following types of scores:

Number Correct: Under the second column is the number of items that Sally answered correctly for that subtest (the total number of items on the subtest is in the first column, Number Possible).

Scaled Score: This is the basic score used to derive all the other scores, sometimes called a *growth score* because it describes growth in achievement that typically occurs as students move through the grades. For example, the average score for third-graders might be 585, whereas the average score for 10th-graders might be 714 on tests with possible scores that range from 0 to 1,000 across the entire K–12 grades. Often, the difficulty of items is included in calculating scale scores (Popham, 2020).

National PR-S (National Percentile Rank and Stanine): This score tells us where Sally stands in relation to students at her grade level across the country in terms of percentile rank (percent with a lower score) and stanine, so a score of 59-5 is a percentile of 59 and a stanine of 5.

National NCE (Normal Curve Equivalent): This is a standard score derived from the percentile rank, with a range of 1 to 99, a mean of 50, and a standard deviation of 21.

Grade Equivalent: This indicates that Sally's scaled score is the same as an average student in the indicated grade and month of school. Beware of the problems with grade-equivalent scores described earlier.

AAC (Achievement/Ability Comparison) Range: The ACC score compares Sally's achievement on each subtest to a norm group of other students who have her same ability as measured by the Otis-Lennon School Ability test. The ACC range categorizes Sally's ACC score as HIGH, MIDDLE, or LOW. You can see that Sally is in the middle on most of the subtests, so her achievement is in the middle compared to students with abilities similar to hers.

National Grade Percentile Bands: This is the range of national percentile scores in which Sally's true score is likely to fall. You may remember from our discussion of true scores that this range, or confidence interval, is determined by adding and subtracting the standard error of the test from Sally's actual score. Chances are high that Sally's true score is within this range. Bands that do not overlap indicate likely differences in achievement.

The bottom of Figure 15.5 (clusters) breaks Sally's subtests down into even more specific skills. For each skill we see the number of questions possible to answer (NP), the number

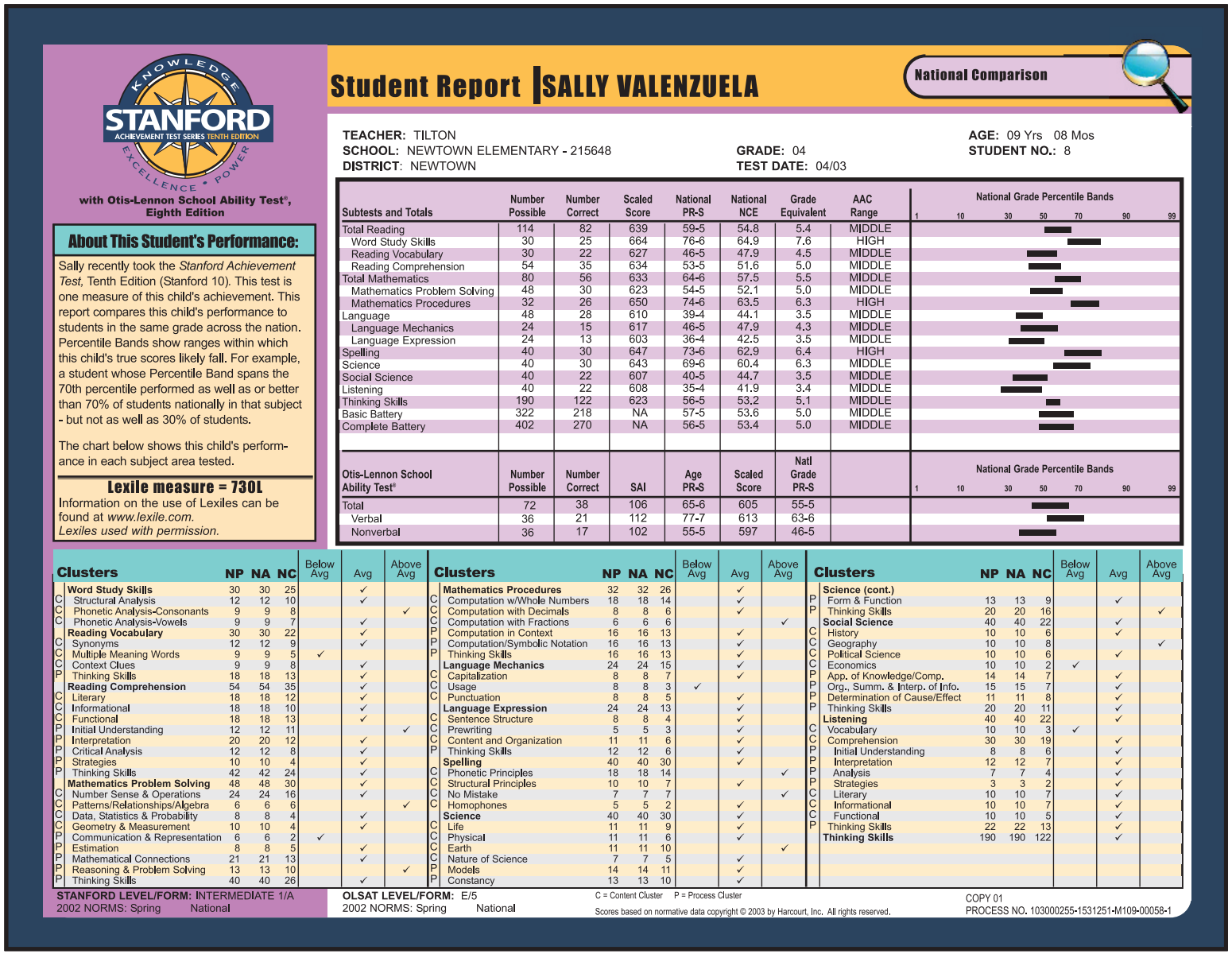
Connect and Extend to PRAXIS II®

Interpreting Achievement Tests (II, C4)

Accurate information from the teacher is essential for students' academic progress. See Cluster 7 for a discussion of how to use praise effectively. These guidelines apply to written feedback as well.

Figure 15.5 A Typical Score Report

A sample test score report, with no actual test data used.



KNOWLEDGE STANFORD ACHIEVEMENT TEST SERIES TENTH EDITION EXCELLENCE • POWER

with Otis-Lennon School Ability Test®, Eighth Edition

Student Report | SALLY VALENZUELA

National Comparison

TEACHER: TILTON
SCHOOL: NEWTOWN ELEMENTARY - 215648
DISTRICT: NEWTOWN
GRADE: 04
TEST DATE: 04/03
AGE: 09 Yrs 08 Mos
STUDENT NO.: 8

About This Student's Performance:

Sally recently took the *Stanford Achievement Test,* Tenth Edition (Stanford 10). This test is one measure of this child's achievement. This report compares this child's performance to students in the same grade across the nation. Percentile Bands show ranges within which this child's true scores likely fall. For example, a student whose Percentile Band spans the 70th percentile performed as well as or better than 70% of students nationally in that subject - but not as well as 30% of students.

The chart below shows this child's performance in each subject area tested.

Lexile measure = 730L
Information on the use of Lexiles can be found at *www.lexile.com.*
Lexiles used with permission.

Subtests and Totals	Number Possible	Number Correct	Scaled Score	National PR-S	National NCE	Grade Equivalent	AAC Range	National Grade Percentile Bands (1 10 30 50 70 90 99)
Total Reading	114	82	639	59-5	54.8	5.4	MIDDLE	
Word Study Skills	30	25	664	76-6	64.9	7.6	HIGH	
Reading Vocabulary	30	22	627	46-5	47.9	4.5	MIDDLE	
Reading Comprehension	54	35	634	53-5	51.6	5.0	MIDDLE	
Total Mathematics	80	56	633	64-6	57.5	5.5	MIDDLE	
Mathematics Problem Solving	48	30	623	54-5	52.1	5.0	MIDDLE	
Mathematics Procedures	32	26	650	74-6	63.5	6.3	HIGH	
Language	48	28	610	39-4	44.1	3.5	MIDDLE	
Language Mechanics	24	15	617	46-5	47.9	4.3	MIDDLE	
Language Expression	24	13	603	36-4	42.5	3.5	MIDDLE	
Spelling	40	30	647	73-6	62.9	6.4	HIGH	
Science	40	30	643	69-6	60.4	6.3	MIDDLE	
Social Science	40	22	607	40-5	44.7	3.5	MIDDLE	
Listening	40	22	608	35-4	41.9	3.4	MIDDLE	
Thinking Skills	190	122	623	56-5	53.2	5.1	MIDDLE	
Basic Battery	322	218	NA	57-5	53.6	5.0	MIDDLE	
Complete Battery	402	270	NA	56-5	53.4	5.0	MIDDLE	

Otis-Lennon School Ability Test®	Number Possible	Number Correct	SAI	Age PR-S	Scaled Score	Natl Grade PR-S		National Grade Percentile Bands (1 10 30 50 70 90 99)
Total	72	38	106	65-6	605	55-5		
Verbal	36	21	112	77-7	613	63-6		
Nonverbal	36	17	102	55-5	597	46-5		

	Clusters	NP	NA	NC	Below Avg	Avg	Above Avg
	Word Study Skills	30	30	25		✓	
C	Structural Analysis	12	12	10		✓	
C	Phonetic Analysis-Consonants	9	9	8			✓
C	Phonetic Analysis-Vowels	9	9	7		✓	
	Reading Vocabulary	30	30	22		✓	
C	Synonyms	12	12	9		✓	
C	Multiple Meaning Words	9	9	5	✓		
C	Context Clues	9	9	8		✓	
P	Thinking Skills	18	18	13		✓	
	Reading Comprehension	54	54	35		✓	
C	Literary	18	18	12		✓	
C	Informational	18	18	10		✓	
C	Functional	18	18	13		✓	
P	Initial Understanding	12	12	11			✓
P	Interpretation	20	20	12		✓	
P	Critical Analysis	12	12	8		✓	
P	Strategies	10	10	4		✓	
P	Thinking Skills	42	42	24		✓	
	Mathematics Problem Solving	48	48	30		✓	
C	Number Sense & Operations	24	24	16		✓	
C	Patterns/Relationships/Algebra	6	6	6			✓
C	Data, Statistics & Probability	8	8	4		✓	
C	Geometry & Measurement	10	10	4		✓	
P	Communication & Representation	6	6	2	✓		
P	Estimation	8	8	5		✓	
P	Mathematical Connections	21	21	13		✓	
P	Reasoning & Problem Solving	13	13	10			✓
P	Thinking Skills	40	40	26		✓	

	Clusters	NP	NA	NC	Below Avg	Avg	Above Avg
	Mathematics Procedures	32	32	26		✓	
C	Computation w/Whole Numbers	18	18	14		✓	
C	Computation with Decimals	8	8	6		✓	
C	Computation with Fractions	6	6	6			✓
P	Computation in Context	16	16	13		✓	
P	Computation/Symbolic Notation	16	16	13		✓	
P	Thinking Skills	16	16	13		✓	
	Language Mechanics	24	24	15		✓	
C	Capitalization	8	8	7		✓	
C	Usage	8	8	3	✓		
C	Punctuation	8	8	5		✓	
	Language Expression	24	24	13		✓	
C	Sentence Structure	8	8	4		✓	
C	Prewriting	5	5	3		✓	
C	Content and Organization	11	11	6		✓	
P	Thinking Skills	12	12	6		✓	
	Spelling	40	40	30		✓	
C	Phonetic Principles	18	18	14			✓
C	Structural Principles	10	10	7		✓	
C	No Mistake	7	7	7			✓
C	Homophones	5	5	2		✓	
	Science	40	40	30		✓	
C	Life	11	11	9		✓	
C	Physical	11	11	6		✓	
C	Earth	11	11	10			✓
C	Nature of Science	7	7	5		✓	
P	Models	14	14	11		✓	
P	Constancy	13	13	10		✓	

	Clusters	NP	NA	NC	Below Avg	Avg	Above Avg
	Science (cont.)						
P	Form & Function	13	13	9		✓	
P	Thinking Skills	20	20	16			✓
	Social Science	40	40	22		✓	
C	History	10	10	6		✓	
C	Geography	10	10	8			✓
C	Political Science	10	10	6		✓	
C	Economics	10	10	2	✓		
P	App. of Knowledge/Comp.	14	14	7		✓	
P	Org., Summ. & Interp. of Info.	15	15	7		✓	
P	Determination of Cause/Effect	11	11	8		✓	
P	Thinking Skills	20	20	11		✓	
	Listening	40	40	22		✓	
C	Vocabulary	10	10	3	✓		
C	Comprehension	30	30	19		✓	
P	Initial Understanding	8	8	6		✓	
P	Interpretation	12	12	7		✓	
P	Analysis	7	7	4		✓	
P	Strategies	3	3	2		✓	
C	Literary	10	10	7		✓	
C	Informational	10	10	7		✓	
C	Functional	10	10	5		✓	
P	Thinking Skills	22	22	13		✓	
	Thinking Skills	190	190	122		✓	

STANFORD LEVEL/FORM: INTERMEDIATE 1/A
2002 NORMS: Spring National

OLSAT LEVEL/FORM: E/5
2002 NORMS: Spring National

C = Content Cluster P = Process Cluster

Scores based on normative data copyright © 2003 by Harcourt, Inc. All rights reserved.

COPY 01
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Source: Sample Stanford Student Report in score report sampler: Guide teaching and learning toward high academic standards for the Stanford Achievement Test Series, 10th Edition (Stanford 10). Copyright © 2009 by NCS Pearson, Inc. Reproduced with permission. All rights reserved.

Sally attempted (NA), and the number she got correct (NC). The check marks beside the skills indicate if she is average, above average, or below average in each. Notice that some skills are assessed with only a few (3 to 8) questions. Remember that fewer items mean less reliability.

DISCUSSING TEST RESULTS WITH FAMILIES. As a teacher you probably will be expected to explain test results to your students and their families. Make sure you know the meaning of all the types of scores your school reports—raw scores, percentiles and percentile bands, scale scores, Lexiles, grade equivalents, stanines, or any others that appear on test reports. With high school students, it is also useful to tell both the students and their parents that only 25% of academic success in college is associated with a student's scores on the SAT or ACT. The other 75% is due to motivation, hard work, study habits, interests, and other factors under the student's control (Popham, 2020). High school grades are better predictors than admission test scores of on-time college graduation, partly because grades provide information about student self-regulation and motivation (Galla et al., 2019). This can be critically important information for families who are afraid their children "aren't meant for college." The *Guidelines: Family and Community Partnerships Conferences and Explaining Test Results* give some other tips.

GUIDELINES

Family and Community Partnerships

Conferences and Explaining Test Results

General Conferencing Guidelines

Decide on a few clear goals for the conference.

Examples

1. Gather information about the student to help in your instruction.
2. Explain grades or test results.
3. Let parents know what is coming during the next unit or marking period.
4. Solicit help from parents.
5. Make suggestions for use at home.

Begin and end with a positive statement.

Examples

1. "Jacob is a natural leader."
2. "Eve really enjoys the science center."
3. "Yesim is really supportive when other students are upset."
4. "Ashanti's sense of humor keeps the class positive."

Listen actively.

Examples

1. Accept the emotions of parents or caregivers. Don't try to talk them out of what they feel.
2. "You seem to feel frustrated when Lee doesn't do his homework."

Respect family members' time and their concerns about their child—establish a partnership.

Examples

1. Speak plainly and briefly, and avoid jargon.
2. Be tactful, but don't avoid talking about tough issues.
3. Ask families to follow through on class goals at home: "Ask Leona for her homework checklist, and help her keep it up to date. I will do the same at school."

Learn from the family members.

Examples

1. Send home a brief questionnaire to be returned before the conference so you can prepare: What are the parents' concerns and questions?

(Continued)

2. What are the students' interests and strengths as revealed in hobbies or extracurricular activities?

Follow up and follow through.

Examples

1. Send a brief note thanking the family members for attending.
2. Share student successes through notes or email messages.
3. Keep families informed before problems develop.

Explaining and Using Test Results

In nontechnical terms, explain the meaning of each type of score on the test report and explain why tests are not "perfect."

Examples

1. If the test is norm referenced, know what the comparison group was (national? state? local district?). Explain that the child's score shows how he or she performed in relation to the other students in the comparison group.
2. If the test is criterion referenced, explain that the scores show how well their child performed specific tasks such as word problems or reading comprehension.
3. Encourage parents to think of the score not as a single point, but as a range or band that includes the score.
4. Ignore small differences between scores.

For norm-referenced tests, use percentile scores. They are the easiest to understand.

Examples

1. Percentile scores tell what percentage of students in the comparison group made the same score or lower. Higher percentiles are better, and 99 is as high as you can get; 50 is average.
2. Percentile scores do not tell the "percent correct," so scores that would be bad on a classroom test (say, 65% to 75% or so) are above average—even good—as percentile scores.

Avoid using grade-equivalent scores.

Examples

1. If parents want to focus on the "grade level" of their child, tell them that high grade-equivalent scores reflect a thorough understanding of the current grade level and NOT the capacity to do higher grade-level work.
2. Tell parents that the same grade-equivalent score has different meanings in different subjects—reading versus mathematics, for example.

Source: Based on ideas from *The successful classroom: Management strategies for regular and special education teachers,* by D. P. Fromberg & M. Driscoll. Published by Teachers College, Columbia University; Scholastic. (2011). Teacher tips for successful parent-teacher conferences, retrieved from https://www.scholastic.com/teachers/articles/teaching-content/teacher-tips-successful-parent-teacher-conferences/; and T. E. Eissenberg & Lawrence M. Rudner (1988). Explaining test results to parents. Retrieved from https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1001&context=pare

Accountability and High-Stakes Testing

Stop & Think How has standardized testing affected your life so far? What opportunities have been opened or closed to you based on test scores? Was the process fair?

Every day, decisions about individuals are based on the results of tests. Should Darius be issued a driver's license? How many and which students from the eighth grade would benefit from an accelerated program in science? Who needs extra tutoring? Test scores may affect "admission" to first grade, promotion from one grade to the next, high school graduation, access to special programs, teacher licensure and tenure, and school funding.

MAKING DECISIONS. When making decisions about individuals based on test results, it is important to distinguish between the *quality* of the test itself and the way the test is *used*. Who will be tested? What are the consequences of choosing one test over another for a particular purpose with a given group? What is the effect of the testing on the students? How will the test scores of minority-group students be interpreted? What do we really mean by *intelligence*, *achievement*, *growth*, and *proficiency*? Do the tests we use to measure these constructs capture what we intended to assess? How will test results be integrated with other information about the individual to make judgments? Answering these questions requires ethical choices based on values as well as accurate information about what tests can and cannot tell us. Keep these values issues in mind as we examine testing uses and decisions.

Because the decisions affected by test scores are so critical, many educators call this process **high-stakes testing**. One of the high-stakes uses for test results is to hold teachers, schools, and administrators **accountable** for student performance. For example, teacher bonuses might be tied to their students' achievement, or schools' funding may be affected by testing results. But, as James Pellegrino (2014) noted, accountability should never be the only purpose of testing: "The problem is that other purposes of assessment, such as providing instructionally relevant feedback to teachers and students, get lost when the sole goal of states is to use them to obtain an estimate of how much students have learned in the course of a year" (p. 1). We need whole systems of assessments that give teachers and students tools for instruction and learning (Guskey, 2020).

WHAT DO TEACHERS THINK? The teachers I work with are frustrated that test results often come too late in the year to help them plan instruction or remediation for their current students. This is one reason formative and interim assessments are becoming more popular—the teachers get the information in time to modify and improve instruction. Teachers also are troubled by the amount of time that testing takes—both to prepare for the tests and to give them. They complain that the tests cover material that their curriculum does not include. What are other problems with high-stakes testing?

DOCUMENTED PROBLEMS WITH HIGH-STAKES TESTING. Studies have found that in some states, 80% of the elementary schools spend about 20% of their instructional time preparing for the end-of-grade tests (Abrams & Madaus, 2003). Studies of the actual high-stakes tests in action show testing narrows the curriculum. What is tested is studied, what is not tested is ignored (Haertel, 2018). For example, using the Texas Assessment of Academic Skills has led to curriculum changes that overemphasize what is tested and neglect other areas. In addition, it seems that the test of mathematics is also a test of reading. Students with poor reading ability have trouble with the math test, especially if their first language is not English.

Another problem—a study of 8 million fourth- and eighth-grade students taking state assessments in 47 states found that the test format affects the scores of girls compared with boys. Males generally do better on multiple-choice items and females on essay items, so in states that rely more on multiple-choice items, there may be a gender gap favoring boys, and the opposite will be true for essay items. The researchers found that about 25% of the variation in gender gaps among the 47 states was due to test item format (Reardon et al., 2018). Finally, tests have become too important—an end in themselves. As one of the most prominent measurement experts has said: "Testing is no longer being employed merely to *measure* the effects of policy interventions—rather, it has itself *become* the intervention . . ." (Haertel, 2018, p. 204). Some uses of standardized tests just are not appropriate, as illustrated in Table 15.4.

New Directions: PARCC and SBAC

In the early 2010s, the federal government gave millions of dollars to two large consortia of states, the Partnership for Assessment of Readiness for College and Careers (PARCC) and the Smarter Balanced Assessment Consortium (SBAC), to develop high-quality assessments

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Standardized Testing: Major Issues (II, C5)

Since their inception, there have been controversies regarding the use of standardized tests in the schools. Familiarize yourself with the major issues that underlie these controversies. Explain the positions of the different camps in these controversies.

High-stakes testing

Standardized tests whose results have powerful influences when used by school administrators, other officials, or employers to make decisions.

Accountable

Making teachers and schools responsible for student learning, usually by monitoring learning with high-stakes tests.

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Alternatives to Standardized Testing (II, C1)

For an overview of the major forms of authentic testing, go to Teachervision.com and search for "authentic assessment."

Table 15.4 Inappropriate Uses for High-Stakes Test Results

Beware of some uses for standardized test results. Tests were not designed for these purposes.

Pass/Fail Decisions	To deny students graduation from any grade, there must be strong evidence that the test used is valid, reliable, and free of bias. Some tests have been challenged in the courts and found to meet these standards, but not all tests are good enough to make pass/fail decisions.
State-to-State Comparisons	You cannot really compare states using standardized test scores. States do not have the same curricula, tests, resources, or challenges. If comparisons are made, they usually tell us what we already know—some states have more funding for schools and more families with higher incomes or higher education levels.
Evaluation of Teachers or Schools	Many influences on test scores—family and community resources—are outside the control of teachers and schools. Often students move from school to school, so many students taking a test in the spring may have been attending that school only for a few weeks.
Identifying Where to Buy a House	Generally speaking, the schools with the highest test scores are in the neighborhoods where families have the highest levels of education and income. They may not be the "best schools" in terms of teaching, programs, academic growth for their students, or leadership, but they are the schools lucky enough to have the "right" students.

Source: From Haladyna, T. H. (2002). *Essentials of standardized achievement testing: Validity & accountability*. Pearson Education, Inc. Adapted by permission.

aligned to the Common Core State Standards. The assessments were meant to measure complex thinking using a range of testing approaches including performance assessment. Since then, some states have formed smaller consortia or are working independently to develop their own assessments that match the standards in their states (Popham, 2020). Most of these assessments are online—no more paper-and-pencil tests—so feedback can be faster and can help inform instruction. Stay tuned for changes in your state. But no matter how fancy the computer-based testing is, the same questions still apply to these new tests: Are they valid? Are they reliable? Do they measure what you taught? Do they measure important outcomes that match the challenges of life today? Do they give you information to improve your teaching (Pellegrino, 2014)?

Using High-Stakes Testing Well: Lessons for Teachers

Overreliance on test scores can be harmful to student learning, but test scores can provide some information if used wisely. After all, good tests should assess what students know, and knowledge is a major goal of schooling (Goldhaber & Özek, 2019). Of course, the tests used must be reliable, valid for the purposes used, and free of bias. In addition, the testing program must:

1. Match the content standards of the district—this is a vital part of validity.
2. Be part of the larger assessment plan. No individual test provides all the necessary information about student achievement. It is critical that schools avoid making pass/fail decisions based on a single test.
3. Test complex thinking, not just skills and factual knowledge.
4. Provide alternate assessment strategies for students with identifiable disabilities.
5. Provide opportunities for retesting when the stakes are high.
6. Include all students in the testing but also provide informative reports of the results that make the students' situations clear if they have special challenges or circumstances such as disabilities.
7. Provide appropriate remediation when students fail.
8. Make sure all students taking the test have adequate opportunities to learn the material being tested.
9. Take into account the first language of the students. Students who have difficulty reading or writing in English will not perform well on tests that require English proficiency.
10. Use test results for children, not against them (Haladyna, 2002).

Reaching Every Student: Helping Students with Disabilities Prepare for High-Stakes Tests

Erik Carter and his colleagues (2005) tested a procedure for preparing students with learning disabilities, mild intellectual disabilities, and language impairments for a high-stakes state test. The students were ages 15 to 19; over half were Black males, and all had individualized education programs (IEPs—see Cluster 5) to guide their education. None had passed the state-required achievement tests. Over six class periods, an instructor taught the students strategies such as filling in bubbles on answer sheets completely, sorting problems by difficulty and doing the easy ones first, using rounding to estimate answers in math, identifying exactly what the question is asking by underlining key words and phrases, and employing strategies for eliminating alternatives that have redundant information or extreme qualifiers.

The good news is that after completing the preparation program, students improved their scores significantly on the tests. But the bad news is that the increases were not large enough to bring most of the students to the passing level. The authors recommend that preparation for testing should occur much earlier for students with disabilities. At an average age of 16, the students in this study already were discouraged (Carter et al., 2005). The *Guidelines: Preparing Yourself and Your Students for Testing* should help you and all your students prepare for high-stakes testing.

GUIDELINES

Preparing Yourself and Your Students for Testing

Advice for Teachers

Make sure the test actually covers the content of the unit of study.

Examples

1. Compare test questions to course learning goals. Make sure that there is good overlap.
2. Check to see if the test is long enough to cover all important topics.
3. Find out if there are any complications your students experience with the test, such as not enough time, too difficult a level of reading, and so on. If there are issues, discuss these problems with appropriate school personnel.

Make sure students know how to use all the test materials.

Examples

1. Several days before the testing, do a few practice questions with a similar format.
2. Demonstrate the use of the answer sheets, especially computer-scored answer sheets.
3. Check with new students, shy students, slower students, and students who have difficulty reading to make sure they understand the questions.
4. Make sure students know if and when guessing is appropriate.

Follow instructions for administering the test exactly.

Examples

1. Practice giving the test before you actually use it.
2. Follow the time limits exactly.

Make students as comfortable as possible during testing.

Examples

1. Do not create anxiety by making the test seem like the most important event of the year.
2. Help the class relax before beginning the test, perhaps by telling a joke or having everyone take a few deep breaths. Don't be tense yourself!
3. Make sure the room is quiet.
4. Discourage cheating by monitoring the room. Don't become absorbed in your own paperwork.

(Continued)

Advice for Students

Use the night before the test effectively.

Examples

1. Study the night before the exam, ending with a final look at a summary of the key points, concepts, and relationships.
2. Get a good night's sleep. If you know you generally have trouble sleeping the night before an exam, try getting extra sleep on several previous nights.

Set the situation so you can concentrate on the test.

Examples

1. Give yourself plenty of time to eat and get to the exam room.
2. Don't sit near a friend. It may make concentration difficult. If your friend leaves early, you may be tempted to do so, too.

Make sure you know what the test is asking.

Examples

1. Read the directions carefully. If you are unsure, ask the instructor or proctor for clarification.
2. Read each question carefully to spot tricky words, such as *not, except,* and *all of the following but one*.
3. On an essay test, read every question first, so you know the size of the job ahead of you and can make informed decisions about how much time to spend on each question.
4. On a multiple-choice test, read every alternative, even if an early one seems right.

Use time effectively.

Examples

1. Begin working right away and move as rapidly as possible while your energy is high.
2. Do the easy questions first.
3. Don't get stuck on one question. If you are stumped, mark the question so you can return to it easily later, and go on to questions you can answer more quickly.
4. On a multiple-choice test, if you know you will not have time to finish, fill in all the remaining questions with the same letter if there is no penalty for guessing.
5. If you are running out of time on an essay test, do not leave any questions blank. Briefly outline a few key points to show the instructor you knew the answer but needed more time.

Know when to guess on multiple-choice or true/false tests.

Examples

1. Always guess when only right answers are scored.
2. Always guess when you can eliminate some of the alternatives.
3. Don't guess if there is a penalty for guessing, unless you can confidently eliminate at least one alternative.
4. Are correct answers always longer? shorter? in the middle? more likely to be one letter? more often true than false?
5. Does the grammar give the right answer away or eliminate any alternatives?

Check your work.

Examples

1. Even if you can't stand to look at the test another minute, reread each question to make sure you answered the way you intended.
2. If you are using a machine-scored answer sheet, check occasionally to be sure the number of the question you are answering corresponds to the number of the answer on the sheet.

On essay tests, answer as directly as possible.

Examples

1. Avoid flowery introductions. Answer the question in the first sentence and then elaborate.
2. Don't save your best ideas for last. Give them early in the answer.

3. Unless the instructor requires complete sentences, consider listing points, arguments, and so on by number in your answer. It will help you organize your thoughts and concentrate on the important aspects of the answer.

Learn from the testing experience.

Examples

1. Pay attention when the teacher reviews the answers. You can learn from your mistakes, and the same question may reappear in a later test.
2. Notice if you are having trouble with a particular kind of item; adjust your study approach next time to handle this type of item better.

Teacher Accountability and Evaluation

One application of standardized tests worries educators—these less-than-perfect tests are sometimes used to evaluate schools and even individual teachers. But it is not fair to evaluate teachers based on test scores for students who began the year with them far below grade level or who were only in the class a few months (Anagnostopoulos et al., 2021). These real concerns have led to new ideas about test scores and testing. Even here, there are strong cautions—read on.

VALUE-ADDED MODELS. What would you say about a teacher whose students began the year reading at the third-grade level and ended the year reading at the fifth-grade level? Sounds like a great year of growth in reading, right? But what if the students were sixth-graders? If we judge that teacher only by her students' achievement at the end of the year, we might think the teacher failed—students ending the sixth grade and still reading at the fifth-grade level! No teaching awards for her! But actually the teacher was very effective (assuming she had the students all year). She added value to their learning—2 years' worth, in fact.

The idea of **value-added modeling (VAM)** is to assess actual growth compared to some baseline of expected average growth. If students can be expected to grow one grade level but they grow two, that is above expected growth. Value-added measures use statistical procedures to determine what students could be expected to learn based on student data from previous years and maybe other relevant information. If the actual student achievement is greater than predicted, then the estimate of the teacher's or school's effect is positive (value is added). If students score as predicted, then the effect is zero, and if they score lower than predicted, then the effect is negative.

Value-added modeling (VAM)

Approaches that use statistical analyses to indicate the average test score gain for students, adjusted for their student characteristics such as prior level of achievement.

You can imagine that to make good judgments with a value-added approach, the tests used must be valid, reliable, and aligned with the curriculum. In addition, there must be room at the top and the bottom of the test scores to capture a full range of achievement. Most current standardized tests, however, measure only grade-level standards, so they are not good at assessing growth for students who perform well above or below the grade level. To assess growth, teachers should have the students for most of the year. Also, the smaller the focus (on just one class instead of a whole school), the more uncertain is the estimate of effects, so the same teacher might seem to have larger effects in some years and smaller effects in other years.

But here are the two biggest concerns. First, to assess teacher effects on learning, students should be assessed as they enter a teacher's class and when they leave. But that would mean giving standardized tests twice a year and too much time is taken up already with testing. In practice, usually student scores from the previous spring testing are compared to the current-year testing, but that means the summer learning loss that many low-income students experience can affect scores, and the teacher had nothing to do with summer learning loss (Atteberry & Mangan, 2020). Second, to really be able to attribute student gains on test scores to their teacher, the students and teachers would have to be

assigned randomly to classes—that never happens. So even with very good, well-chosen tests, other factors involved in who gets into which class with which teacher may still be contributing to test score gains or losses. For example, consider a beloved math teacher in the school. Parents of the best math students push to get their children in this teacher's class. Because the students are already scoring at the top of the yearly achievement tests, there is little room for growth, and the teacher's value-added contribution could seem low. Or the scores of other students might not "grow" because the school was in bad physical condition, the instructional materials were poor quality and dated, or the students worked after school and never had time for homework—all outside the teacher's control (Popham, 2020). In an extensive review of value-added research, Kimberlee Everson (2017) noted that no one has suggested a "framework or methodology for untangling a teacher's contribution from confounding influences, such as access to classroom materials, specialist support, or tutoring" (p. 61).

The researchers who have developed value-added modeling are very concerned about misuses, especially in teacher evaluation (Tobiason, 2019). To be valuable, the value-added scores must be based on several years of data from a large number of students. These measures should only be used to identify strengths and weaknesses in the school or the curriculum and to guide professional development, but *not to evaluate individual teachers* (American Educational Research Association Council, 2015; Blazar et al., 2016). Still, you may be in a school that uses value-added measures, so it makes sense to learn about them.

SO HOW SHOULD WE EVALUATE TEACHERS? In her extensive review of VAM research, Kimberlee Everson (2017) concluded that we cannot use value-added measures or any procedures to evaluate teachers until we answer some fundamental questions about what is good teaching—a question we have raised throughout this book. Everson asks, is a good teacher one who helps students reach only academic goals or nonacademic goals as well? Does a good teacher bring all students to a set standard, regardless of their background, or does the teacher strive to take every student as far as she or he can go? Who is the right comparison person for a teacher? In Cluster 1, we described different approaches to defining good teaching. Making sure the way we evaluate teachers matches our conception of good teaching is really a question about validity in assessing teachers. In terms of reliability, in an extensive test of the New Mexico evaluation system as applied to about 21,000 teachers from 2015 to 2016, Sy Doan and colleagues (2019) found that 40% of the teachers they studied would have gotten a different composite score if they were reevaluated in the same year. The greater the weight of value-added information in the composite scores, the less consistent the estimates of scores at reevaluation.

A BROADER APPROACH: MEASURES OF TEACHER EFFECTIVENESS. In 2009, the Bill and Melinda Gates Foundation launched the Measures of Effective Teaching (MET) Project, a research partnership between 3,000 teachers and research teams at dozens of institutions. The foundation tackled teacher evaluation because research shows that teachers matter; they matter more than technology or funding or school facilities. In pursuing the goal, the project members made a key assumption: teaching is complex; multiple measures will be needed to capture effective teaching and provide useful feedback for personnel decisions and professional development. In addition to using student achievement gains on state tests, the MET researchers examined many established and newer measures of effectiveness. The final report of the project (MET Project, 2013) identified the following three measures that, if used together, are a valid and reliable way of assessing teaching that leads to student learning:

1. Student *gains on state tests*.
2. Surveys of *student perceptions* of their teachers based on the Tripod Student Perception Survey developed by Ron Ferguson at Harvard University (Ferguson, 2008). This survey asks students to agree or disagree with statements such as "My teacher takes time to help us remember what we learn" (for K–2 students); "In class we learn to correct our mistakes" (upper elementary students); and "In this class, my teacher accepts

nothing less than our full effort" (secondary students) (from Cambridge Education, Tripod Project, Student Survey System).

3. *Classroom observations* from the Danielson (2013) Framework for Teaching.

These look like good choices. Both Tripod scores from students and Danielson Framework scores from observers predict student academic growth on achievement tests (Sandilos et al., 2019). But remember, teaching is complex. To capture effective teaching, these measures have to be used accurately and together. Also, as you look at teacher observation in general—the same person teaching the same material to different students can be rated as more or less effective by an observer, depending on the students (Fauth et al., 2020). As experienced teachers know, students who are more interested and motivated make teachers look better. Also, there is evidence that male teachers in general and teachers in classrooms with high concentrations of Black, Latino, male, and low-performing students receive significantly lower class-observation ratings. Class composition may bias ratings (Campbell & Ronfeldt, 2018). No system is perfect. The most important system for you is the one that your school will use to evaluate your teaching—find out what it is.

Module 47 Summary

Standardized Testing (pp. 681–695)

What are mean, median, mode, and standard deviation? The mean (arithmetical average), median (middle score), and mode (most common score) are all measures of central tendency. The standard deviation reveals how scores spread out around the mean. A normal distribution is a frequency distribution represented as a bell-shaped curve. Many scores cluster in the middle; the farther from the midpoint, the fewer the scores.

Describe different kinds of scores. There are several basic types of standardized test scores: percentile rankings, which indicate the percentage of others who scored at or below an individual's score; grade-equivalent scores, which indicate how closely a student's performance matches average scores for a given grade; and standard scores, which are based on the standard deviation. *T* and *z* scores are both common standard scores. A stanine score is a standard score that incorporates elements of percentile rankings.

What are some current issues in testing? Controversy over standardized testing has focused on the role of tests and interpretation of results, the problems with accountability based on test scores, and the ways testing restricts the curriculum. If the test matches important learning targets of the curriculum, is given to students who actually studied the curriculum for a reasonable period of time, is free of bias, fits the students' language capabilities, and was administered properly, then test results provide some information about the effectiveness of the school. Expert teachers see both the advantages of and problems with standardized testing, but about 50% believe such tests do more harm than good. Teachers should use results to improve instruction, not to stereotype students or justify lowered expectations. PARCC and SBAC, two large consortia of states, are developing a new set of K–12 assessments in English and math anchored in what it takes to be ready for college and careers and consistent with the Common Core State Standards.

Can students become better test takers? How? Performance on standardized tests can be improved if students gain experience with this type of testing and are given training in study skills and problem solving. Many students can profit from direct instruction about how to prepare for and take tests. Involving students in designing these test preparation programs can be helpful. Students with learning challenges may benefit from intensive and ongoing preparation for taking tests, particularly if the test-taking strategies are tied to specific problems and content learned and tested.

What are some current directions in teacher evaluation? Concerns about the problems with high-stakes tests, the unfairness in evaluating teachers based on test scores of students who began the year far below grade level, and the variability in curricula in different school districts and states have led to new ideas about test scores and testing. Value-added modeling indicates

the average test score gain for students, adjusted for their characteristics such as prior level of achievement (where they started the year). Experts agree that value-added scores alone cannot be used to evaluate schools or teachers. The Bill and Melinda Gates Foundation launched the Measures of Effective Teaching (MET) Project, a research partnership between 3,000 teachers and research teams at dozens of institutions that has identified a three-part system for evaluating good teaching that includes gains on state achievement tests, student perceptions of teachers, and classroom observations using the Danielson Framework for Teaching. Teacher observation, however, is subject to bias based on the behavior of the students or even class composition.

Cluster 15 Review

Key Terms

Accountable
Assessment
Assessment bias
Authentic assessments
Central tendency
Classroom assessments
Confidence interval
Criterion-referenced grading
Criterion-referenced testing
Distractors
Formative assessment
Grade-equivalent score
Grading on the curve
High-stakes testing
Informal assessments
Interim (growth or benchmark) assessments
Mean
Measurement
Median
Mode
Norm group
Norm-referenced grading
Norm-referenced testing
Normal distribution
Percentile rank
Performance assessments
Portfolio
Pretest
Range
Reliability
Scoring rubrics
Selected-response testing
Standard deviation
Standard error of measurement
Standard scores
Standardized tests
Stanine scores
Stem
Summative assessment
T score
True score
Validity
Value-added modeling (VAM)
Variability
z score

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Multiple-Choice Questions

1. Which of the following assessment methods provides feedback that is nonevaluative, occurs before or during instruction, and guides teachers in planning and improving instruction?

A. Summative
B. Criterion referenced
C. Formative
D. Norm referenced

2. The yearly standardized test in Mr. Taylor's class is given in the spring. By the summer, Mr. Taylor's students received their scores in the mail. Many of the parents were upset and contacted Mr. Taylor regarding their children's "low scores." "Mr. Taylor, I don't understand how my daughter could be in honors classes and have scores on her standardized test in the 70s?" "Your daughter's scores are above the average nationally. The average score would be a 50." What type of scoring is being used in the yearly tests Mr. Taylor's class must take?

A. Criterion referenced
B. Norm referenced
C. Raw scores
D. Authentic scoring

3. Maria had proven to be a very good student in Mr. Rhodes's class despite having just moved to the United States from another country. So it came as a surprise when Maria performed poorly on her tests. When Mr. Rhodes consulted another teacher who also had Maria as a student, he learned that his test questions may have had something to do with it. His colleague explained that Maria came from a relatively primitive area that does not have television. Her exposure to

concepts that draw on a wide variety of cultural experiences was limited. This indicated to Mr. Rhodes that his tests unfairly penalized Maria. This type of assessment that unfairly penalizes a student for his or her lack of resources or cultural knowledge demonstrates which of the following?

A. Attribution bias
B. Assessment bias
C. Reliability bias
D. Validity bias

4. Which one of the following types of assessments would be most beneficial for assessing a student's ability to debate?

A. Formative assessment
B. Portfolio assessment
C. Summative assessment
D. Performance assessment

Constructed-Response Questions

Case

"How will you grade our oral book reports, Miss Wren?"

"I am going to grade them *with* each of you! We will develop what is called a *rubric*. It is a list of items on which you should focus while preparing and presenting your book report."

"How will we be involved?"

"You will help me make the rubric. What are some of the things you think should be included in your oral report?"

"I think we should have to have audience participation, or else it gets too boring!"

"Good idea, Terry. What else?" The class continued to add to the rubric until there were six aspects on which to focus. "Class, you will also assist me in grading your performance by using the rubric. By making the rubric and using it to grade yourself, you should do very well."

"There are no surprises that way!" Lisa shouted.

5. In addition to listing the criteria for what constitutes quality work and having students self-assess, list some additional guidelines for Miss Wren to remember when developing a rubric.

6. Grades, a form of extrinsic reinforcement, can be a source of celebration for Miss Wren's students or a punishment. To make the most of grades and increase her students' chances for success, what should Miss Wren keep in mind when grading her students?

What Would They Do?

Teachers' Casebook: Giving Meaningful Grades

At the beginning of this cluster, we asked you to think critically about what kind of grading system you will use. Now, as you consider these teachers' responses to that question, we again suggest that you think critically. Do the following responses reflect (or contradict) any of the concepts discussed in this cluster? Do the suggestions and solutions described here make sense in light of what you have learned in this or other classes about best practices? How do these ideas align with or challenge your personal philosophy of teaching?

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Consulting curriculum documents and performance standards is a key first step towards successful assessment. The teacher needs to have a clear understanding of what excellence looks like in order to know what questions to ask and feedback to give to promote learning and growth.

At the beginning of the school year, communicating the grading language and definitions to parents and learners is essential. Clarity in how you interpret progress in relation to learning standards, no matter the method, is important to ensure shared understandings. In this scenario, you are mandated to use letter grades, so make clear the definitions of these letters early and often.

From here, take time to teach students mastery language. In this case, I would use mastery language with letter grades equated for reporting periods only as I have found letter grades to hinder the process of learning; letter grades tend to become the goal rather than mastering the learning goal itself.

With students, practice assessing learning with mastery language using something familiar, like learning how to ride a bike or toddlers learning how to walk. This helps give a reference that is more easily understood than first trying self-assessment with writing a good paragraph or effective communication in math.

Then, when planning for assessment, determine which curricular skills, content, understanding and core competencies to focus on and name throughout the unit of study. It is important to give students time to engage with the learning goals by co-creating criteria that demonstrate a skill at a standard. Using examples and allowing students to sort and determine for themselves what works and why allows them to take ownership of the learning goal and understand it from the beginning.

Instructionally, students are intentionally reminded of the goals and the criteria decided upon consistently through visuals, rubrics with the students' exact language, reflections, and in self and peer assessments. Students use single-point rubrics for ease and efficiency at the end of lessons while multi-point mastery rubrics are used for clarity and as a means to build understanding of goals and next steps in learning. Throughout the unit, descriptive feedback is provided during lessons or in response to assignments that ask questions and is specific about learning progress in relation to standards.

In the end, students would either complete a project or task that requires application of learned skills and knowledge or choose a strong piece of evidence to showcase growth. This evidence can be chosen from the variety of times they were asked to use the skills and knowledge to best demonstrate where they are in their learning now, how they know, and where they will go to next.

This process works in all subject areas and grades. The assessment in the end, the letter grade equated from the mastery language, is easily justified to parents, administrators, and students as it is clear from the beginning what that grade standard looks like as they have been central to the learning process. We also have multiple pieces of evidence to draw upon to prove the grade itself if it were ever unclear.

From start to finish, this process of assessment ends up becoming the means to deep learning and reflection for all.

Maria Avila • 5th-Grade Math and Science Teacher

Stone Lakes Elementary School, Orlando, FL

I have worked at multiple schools, one of which allowed us the freedom and flexibility to grade as we wished, provided we could justify our system to parents. Although this was great for the teachers, it wasn't so great for the students or parents, as this system replicated the scenario above. It led to parents requesting specific teachers because they were "easy graders."

Ultimately, having a standard grading approach across a grade level or school would be the best-case scenario. I feel my current school does just that. Teachers have the freedom and flexibility to grade as we wish, however we must come up with a general system across a grade level. Our grade level currently assigns a weighted average of 40% on tests, 35% on quizzes and 25% on class work. This is not ideal for me as I struggle with assigning so much weight on tests, however it is one I can live with. It provides the flexibility for me to weight projects as a test grade if I choose to do so. The major graded assignments and projects that I assign tend to have students demonstrate proficiency with a concept or standard. As a math and science teacher, I provide students with an error analysis that they have to justify. They examine the error and provide a justification as to where the error was made and why. I then grade this using a rubric. In fact, most of the open-ended assignments I grade have a rubric that I have discussed, reviewed, and modified with the students. When it comes to group projects, I have the students self-assess their work and I note their participation in the social/emotional component of their report card. In my 24 years of teaching, grading continues to be an ever-evolving issue—there just isn't a perfect method, but we can strive for fairness.

Katie Churchill • 3rd-Grade Teacher

Oriole Parke Elementary School, Chicago, IL

I use a combination of assessment tools to evaluate my students. Using a rubric that students and parents alike are familiar with provides an easy-to-follow-and-understand grading system. The rubric needs to remain in a focal area in the classroom as a constant reminder to the students of what their expectations are.

By differentiating instruction consistently to cover all learning styles and modalities, the students hopefully become more involved and invested in their own learning and, as a result, produce better quality work and exceed expectations.

Several factors play a part in obtaining a particular letter grade. The letter grade is earned through a combination of group work, completing objectives, and following the rubric guidelines for quality work.

Madya Ayala • High School Preparatory Teacher

Eugenio Garza Lagüera, Campus Garza Sada, Monterrey, N. L. Mexico

I think it is important to assess a cross-section of student work. First, portfolios can be a useful way to gather various types of work throughout the year. Using a portfolio, a teacher can then attach a letter grade to student progress and achievement. It is important to grade children not only on progress, but also on their understanding of material. I use meaningful, written assessments to test for retention and understanding of my students' knowledge. Finally, I grade various projects and experiments so that the students who are better project-based learners will be graded fairly. I also like the idea of using a rubric system to grade students on writing or projects. Under a rubric system, a teacher allocates a certain number of points to each content area. It is then easy to attach a letter grade based on the number of points received.

Katie Piel • Kindergarten–6th-Grade Teacher

West Park School, Moscow, ID

Students should be given the latitude to express achievement in different ways like group projects, daily class work, tests, and individual projects. All students are held accountable for demonstrating their own learning. With each teacher grading on a different standard, the teachers must also take on the responsibility of collaborating with their peers. Communicating

to other teachers the skills a student can be expected to bring with him or her to the next level is crucial.

Allan Osborne • Assistant Principal

Snug Harbor Community School, Quincy, MA

Any grading system should consider a student's progress and effort. Grading systems also should be individualized to account for a student's unique strengths and weaknesses. Thus, a student with a learning disability should not be held to the same expectations as a gifted student.

The most critical aspect of any successful grading system is that it is fair. Fairness dictates that students and their parents be given information in advance about class requirements and expectations, along with a description of grading criteria. A system that is fair can be easily justified. It is also important to keep accurate and detailed records of student progress. In addition to recording grades on tests, quizzes, and projects, anecdotal records describing a student's typical performance should be kept. These records can be valuable if a report card grade is questioned.

Although group assignments can be an important learning experience, I would be reluctant to place too much emphasis on a group project grade. As we all know, each member of the group does not participate equally, and thus, a group grade does not reflect the contribution of each individual member.

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Licensure Appendix

Part 1

Licensure Examination Study Guide

You probably will have to take a licensure examination in order to become a teacher in your state. In over 40 states and jurisdictions, the Praxis II® test is the required licensure examination. This section highlights the concepts from each cluster that may be on your licensure test.

Cluster 1

Developing relationships with professionals: Until you become a teacher, it will be difficult to establish a working relationship with other practitioners. However, you might find this site beneficial: K–12 Practitioners' Circle (nces.ed.gov/practitioners/teachers.asp).

Keeping current with educational issues: Education Week (http://www.edweek.org) will keep you up-to-date about innovations in teaching, policy initiatives, and changes in public laws related to education. These issues are often highly complex. The use of critical thinking skills is essential when making judgments about the information you will encounter in this type of publication.

Cluster 2

Recognize the influences that socioeconomic status, race, ethnicity, gender, sexual orientation, and community values may have on:

- Student learning preferences
- Academic achievement
- Attitudes, self-esteem, and expectations for success
- Opportunities for quality educational experiences
- Teachers' attention to students

Devise strategies that:

- Increase awareness of stereotypes and biases
- Eliminate racist, sexist, and other discriminatory teaching practices
- Promote culturally-relevant teaching
- Promote positive school–home relationships

Cluster 3

Understand how the brain works:

- Brain imaging techniques
- Neurogenesis and brain development
- Plasticity
- Brain-based educational strategies

For theories of cognitive development, you should understand:

- Basic assumptions of Piagetian and Vygotskian theories
- How students build their unique knowledge bases

- How students acquire skills
- Important terms and concepts related to each theory
- The key steps, mechanisms, or milestones related to each theory
- The limitations of each theory

Cluster 4

Understand the major concepts and progressions related to:

- Bronfenbrenner's bioecological model of development
- Erikson's theory of psychosocial development
- Piaget's and Kohlberg's perspectives on moral development
- Gilligan's theory of caring
- The distinction between moral judgments and social conventions
- Haidt's social intuitionist model

Design or choose strategies that:

- Support optimal social and emotional development of students
- Help students cope with major life transitions and challenges to safety as well as physical and mental health
- Help students build a sense of self-concept, self-esteem, and self-identity (including racial identity)

Recognize signs or behaviors that indicate sexual abuse or child abuse.

Cluster 5

Explain the effects of legislation on public education:

- Americans with Disabilities Act
- Individuals with Disabilities Education Improvement Act
- Section 504
- Individualized education programs
- Inclusion and least restrictive environment

Understand views of intelligence and describe its measurement:

- Types of intelligence tests and their uses
- Multiple intelligences
- Interpreting intelligence scores

Explain how creativity is defined and assessed.

Describe and differentiate among learning styles and preferences.

Accommodate the needs of students with exceptionalities:

- Attention-deficit hyperactivity disorder
- Visual and speech difficulties
- Differences in mental abilities
- Learning disabilities
- Intellectual disabilities
- Autism spectrum disorders

Cluster 6

For the development of language, you should understand:

- Diversity in language development
- The major accomplishments of language development of school-age children
- The relationship between language and literacy
- Basic steps that teachers can take to enhance literacy among their students
- Strategies that support English acquisition in non-English–speaking students

Cluster 7

Understand the basic assumptions and contributions of these behaviorists:

- Pavlov
- Skinner

Determine appropriate behavioral techniques to:

- Foster appropriate classroom conduct

Understand basic processes of operant conditioning and their roles in learning, including:

- Antecedents and consequences
- Types of reinforcement and reinforcement schedules
- Punishment
- Shaping

Cluster 8

Understand how memory and recall are affected by:

- The limitations, capacities, and capabilities of the various structures of human memory (e.g., memory stores)
- The manner in which humans process information
- Prior knowledge of a topic
- Executive control processes

Explain how students and teachers can enhance learning through the use of:

- Elaboration and mnemonic devices
- Organized presentations
- Meaningful learning and instructional activities

Cluster 9

Focus on each of these major topics:

- Metacognitive knowledge and learning
- Learning strategies
  - Basic principles of teaching these strategies
  - Cognitive processes involved in various strategies
  - Appropriate uses of different strategies

- Problem solving
  - General problem-solving strategies/heuristics and algorithms
  - The value of problem representation
  - Factors that impede problem solving
- Critical thinking
- Transfer of learning
  - Types of transfer and promoting transfer

Cluster 10

Explain the advantages and appropriate uses of major student-centered approaches to learning and instruction:

- Inquiry learning
- Problem-based learning
- Cognitive apprenticeships
- Cooperative learning

Understand important concepts related to student-centered models of instruction:

- Situated learning
- Complex learning environments
- Authentic tasks
- Multiple representations of content
- Piaget and Vygotsky: theories of constructivism

Recognize how technology influences learning both positively and negatively.

Cluster 11

Focus on these major topics:

- Bandura's social cognitive theory
- Modeling and observational learning
- Learner agency
- Self-efficacy
- Teachers' sense of efficacy
- Self-regulated learning
- Helping students monitor and regulate learning
- Self-regulation of emotions

Cluster 12

Describe the theoretical foundations of the major approaches to motivation.

- Identify and define important terms related to motivation including *needs*, *self-determination*, *goals*, *expectancies*, *values*, *costs*, *attributions*, *beliefs about ability*, *interest*, *curiosity*, and *emotions*.
- Use your knowledge of motivation to:
  - Identify situations and conditions that can enhance or diminish student motivation to learn
  - Design strategies to support individual and group work in the classroom
  - Implement practices that help students become self-motivated

Cluster 13

Understand principles of classroom management that promote positive relationships by:

- Establishing daily procedures and routines
- Developing student–teacher relationships and parent–teacher relationships
- Responding effectively to minor student misbehavior
- Implementing reasonable rules, procedures, penalties, and rewards
- Keeping students actively engaged in purposeful learning

Diagnose problems and prevent or reduce inappropriate behaviors by:

- Communicating effectively with students and parents
- Addressing misbehaviors in the least intrusive way possible
- Confronting disruptive behaviors in an effective, efficient manner

Cluster 14

Develop plans for instruction and consider:

- The role of objectives in instruction
- Writing learning targets
- The use of educational taxonomies to identify effective objectives
- The role of independent practice (i.e., independent work/seatwork and homework)
- Direct instruction
  - Basic assumptions
  - Appropriate uses/principles of implementation

Understand the basic principles of teacher-centered and student-centered forms of instruction, including:

- Appropriate uses and limitations
- The role of the teacher
- Effective questioning techniques
- Whole-group discussions
- Recitation
- Thematic/interdisciplinary instruction
- Differentiated instruction

Cluster 15

Describe the characteristics and purposes of major types of tests:

- Criterion-referenced and norm-referenced tests
- Formative, interim, and summative tests

Explain the major issues related to concerns about standardized testing, including:

- High-stakes testing
- Bias in testing
- Test-taking programs

Understand major concepts related to classroom assessment and grading:

- Formative and summative assessment
- Reliability and validity
- Criterion-referenced and norm-referenced grading

Describe the characteristics, uses, and limitations of major assessment techniques, including:

- Multiple-choice items
- Essays
- Portfolios
- Exhibitions (performances)

Design a scoring rubric for an authentic learning task that possesses:

- Validity
- Reliability
- Generalizability
- Equity

Standardized testing

- Interpreting different types of scores
- Criticisms of standardized testing

Part 2

Correlating Text Content to the PRAXIS II® Principles of Learning and Teaching Tests and InTASC Model Core Teaching Standards

Each state in the country has its own set of licensure requirements that new teachers must meet in order to work in the classroom. An increasing number of states are basing their requirements on standards developed by InTASC (Interstate Teacher Assessment and Support Consortium). These standards are based on 10 principles and foundations of effective teaching practice that InTASC has identified as essential for optimal student learning. Many states assess new teachers' knowledge of those principles through the use of tests from the Praxis II® series published by the Educational Testing Service. Within the Praxis II® series are three Principles of Learning and Teaching (PLT) tests, one each for grades K–6, 5–9, and 7–12. Each PLT test assesses students' knowledge of educational psychology and its application in the classroom.

The following table is designed to help you study for your PLT test and meet the Essential Knowledge indicators for each of InTASC's 10 principles of effective teaching. The left-hand column of the table lists the topics assessed in a PLT test. The right-hand column contains InTASC's Knowledge standards. In the center column, you will find the clusters and sections in this textbook that correspond to the PLT tests and InTASC standards.

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
I. Students as Learners		
A. Student Development and the Learning Process		
1. Theoretical foundations about how learning occurs: how students construct knowledge, acquire skills, and develop habits of mind	*Clusters 6–12* (entire clusters)	1(d) The teacher understands how learning occurs—how learners construct knowledge, acquire skills, and develop disciplined thinking processes—and knows how to use instructional strategies that promote student learning.
■ Examples of important theorists:		
● Jean Piaget	*Cluster 3*/Piaget's Theory of Cognitive Development *Cluster 10*/Cognitive and Social Constructivism	
● Lev Vygotsky	*Cluster 3*/Vygotsky's Sociocultural Perspective *Cluster 10*/Cognitive and Social Constructivism	
● Howard Gardner	*Cluster 5*/Another View: Gardner's Multiple Intelligences	
● Robert Sternberg	*Cluster 5*/Another View: Sternberg's Successful Intelligence	
● Albert Bandura	*Cluster 7*/Beyond Behaviorism: Bandura's Challenge and Observational Learning *Cluster 11*/Social Cognitive Theory	
● Urie Bronfenbrenner	*Cluster 4*/Bronfenbrenner: The Social Context for Development	
■ Important terms that relate to learning theory:		
● Adaptation	*Cluster 3*/Basic Tendencies in Thinking	
● Conservation	*Cluster 3*/Four Stages of Cognitive Development	
● Constructivism	*Cluster 3*/The Role of Learning and Development; Implications of Piaget's and Vygotsky's Theories for Teachers *Cluster 10*/Constructivism and Interactive Learning (entire cluster)	
● Equilibration	*Cluster 3*/Basic Tendencies in Thinking	
● Co-constructed process	*Cluster 3*/The Social Sources of Individual Thinking	
● Private speech	*Cluster 3*/The Role of Language and Private Speech	
● Scaffolding	*Cluster 3*/Private Speech and the Zone; Vygotsky: What Can We Learn?; *Guidelines:* Applying Vygotsky's Ideas in Teaching *Cluster 10*/ Facilitating Deep Learning in a Constructivist Classroom; Common Elements of Learner-Centered Teaching	
● Zone of proximal development	*Cluster 3*/The Zone of Proximal Development; Reaching Every Student: Teaching in the "Magic Middle" *Cluster 10*/Social Constructivism	
● Learning	*Cluster 2*/Diversity in Learning *Cluster 3*/Cognitive Development *Cluster 7*/Understanding Learning; Behavioral Views of Learning *Cluster 8*/Cognitive Views of Learning *Cluster 9*/Metacognition; Learning Strategies *Cluster 10*/Learning in Groups *Cluster 10*/Learning through Cooperation *Cluster 10*/Constructivist Views of Learning	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
	Cluster 11/Social Cognitive Theory *Cluster 11*/Modeling: Learning by Observing Others *Cluster 11*/Self-Regulated Learning: Skill and Will *Cluster 11*/Bringing It All Together: Theories of Learning *Cluster 12*/Motivation in Learning and Teaching (entire cluster)	
● Knowledge	*Cluster 3*/The Social Sources of Individual Thinking; Activity and Constructing Knowledge *Cluster 8*/The Importance of Knowledge in Cognition; Teaching for Long-Lasting Knowledge: Basic Principles and Applications *Cluster 10*/How Is Knowledge Constructed?; Knowledge: Situated or General?	
● Memory	*Cluster 8*/Cognitive Views of Memory; Long-Term Memory	
● Schemas	*Cluster 8*/Schemas	
● Transfer	*Cluster 9*/Teaching for Transfer	
2. Human development in the physical, social, emotional, moral, and cognitive domains		1(e) The teacher understands that each learner's cognitive, linguistic, social, emotional, and physical development influence learning and knows how to make instructional decisions that build on learners' strengths and needs
■ Contributions of important theorists:		
● Jean Piaget	*Cluster 3*/Piaget's Theory of Cognitive Development *Cluster 10*/Cognitive and Social Constructivism	
● Lev Vygotsky	*Cluster 3*/Vygotsky's Sociocultural Perspective *Cluster 10*/Cognitive and Social Constructivism	
● Albert Bandura	*Cluster 7*/Beyond Behaviorism: Bandura's Challenge and Observational Learning *Cluster 11*/Social Cognitive Theory	
● Erik Erikson	*Cluster 4*/Erikson: Stages of Psychosocial Development	
● Lawrence Kohlberg	*Cluster 4*/Kohlberg's Theories of Moral Development	
● Carol Gilligan	*Cluster 4*/Criticisms of Kohlberg's Theory	
● Jonathan Haidt	*Cluster 4*/Beyond Reasoning: Haidt's Social Intuitionist Model of Moral Psychology	
■ Major progressions in each developmental domain and the ranges of individual variation within each domain	*Cluster 2*/Ethnic and Racial Identity; Gender Identity *Cluster 3*/Four Stages of Cognitive Development; Information Processing, Neo-Piagetian, and Neuroscience Views of Cognitive Development; Some Limitations of Piaget's Theory; The Social Sources of Individual Thinking *Cluster 3*/Four Stages of Cognitive Development; Information Processing, Neo-Piagetian, and Neuroscience Views of Cognitive Development; Some Limitations of Piaget's Theory; The Social Sources of Individual Thinking *Cluster 4*/Physical and Motor Development; Identity and Self-Concept; Understanding Others and Moral Development *Cluster 6*/The Development of Language	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
■ Impact of students' physical, social, emotional, moral, and cognitive development on their learning and ways to address these factors when making decisions	*Cluster 2*/Creating Culturally Welcoming Classrooms; *Guidelines*: Avoiding Gender Bias in Teaching; *Guidelines*: Culturally Relevant Teaching *Cluster 3*/Four Stages of Cognitive Development; Some Limitations of Piaget's Theory; *Guidelines:* Family and Community Partnerships; *Guidelines:* Teaching the Concrete-Operational Child; *Guidelines:* Helping Students to Use Formal Operations; The Social Sources of Individual Thinking; Assisted Learning; The Zone of Proximal Development *Cluster 4*/Physical Development; Erikson: Stages of Psychosocial Development; Identity and Self-Concept; Understanding Others and Moral Development; Personal/Social Development: Lessons for Teachers *Cluster 6*/The Development of Language *Cluster 10*/*Guidelines*: Supporting the Development of Media Literacy *Cluster 11*/Teaching Toward Self-Efficacy and Self-Regulated Learning; *Guidelines*: Encouraging Emotional Self-Regulation *Cluster 13*/Maintaining a Good Environment for Learning	
■ How development in one domain, such as physical, may affect performance in another domain, such as social	*Cluster 3*/General Principles of Development; The Brain and Cognitive Development; Influences on Development *Cluster 4*/Physical Development	
B. Students as Diverse Learners		
1. Differences in the ways students learn and perform	*Cluster 5*/Learner Differences and Learning Needs *Cluster 2*/Culture and Diversity	2(g) The teacher understands and identifies differences in approaches to learning and performance and knows how to design instruction that uses each learner's strengths to promote growth.
● Learning styles and preferences	*Cluster 5*/Learning Styles/Preferences *Cluster 2*/Diversity in Learning	
● Multiple intelligences	*Cluster 5*/Another View: Gardner's Multiple Intelligences	
● Performance modes ● Concrete-operational thinking	*Cluster 3*/Later Elementary to the Middle School Years: The Concrete-Operational Stage; *Guidelines:* Teaching the Concrete-Operational Child	
● Visual and aural learners	*Cluster 5*/Learning Styles: Proceed with Caution; Students with Learning Challenges *Cluster 6*/Generation 1.5: Learners in Two Worlds	
● Race and ethnicity	*Cluster 2*/Stereotypes, Prejudice, and Discrimination; Ethnicity and Race in Teaching and Learning; Creating Culturally Welcoming Classrooms	
● Gender differences	*Cluster 2*/Gender and Sexual Orientation in Teaching and Learning; *Guidelines:* Avoiding Gender Bias in Teaching *Cluster 4*/Sex Differences in Self-Concept of Academic Competence *Cluster 5*/Sex Differences in Intelligence and Achievement	
● Cultural expectations and styles	*Cluster 2*/Who Are You? Who Are Your Students? Culture and Diversity (entire cluster) *Cluster 6*/Teaching Immigrant Students and English Learners *Cluster 6*/Classrooms Today *Cluster 14*/Teacher Expectations	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
• English Language Learners	*Cluster 6*/Diversity in Language Development; Teaching Immigrant Students and English Learners; Special Challenges: Students Who Are English Learners with Unique Learning Needs and Gifts *Cluster 2*/Creating Culturally Welcoming Classrooms	
2. Areas of exceptionality in students' learning	*Cluster 5*/Learner Differences and Learning Needs	2(h) The teacher understands students with exceptional needs, including those associated with disabilities and giftedness, and knows how to use strategies and resources to address these needs.
• Special physical or sensory challenges	*Cluster 5*/Students with Communication Impairments; Students with Health and Sensory Impairments	
• Learning disabilities	*Cluster 5*/Students with Specific Learning Disabilities; Individualized Education Program; Section 504 Protections *Cluster 6*/Special Challenges: Students Who Are English Learners with Unique Learning Needs and Gifts	
• Attention-deficit hyperactivity disorder (ADHD)	*Cluster 5*/Students with Hyperactivity and Attention Disorders	
• Intellectual disabilities	*Cluster 5*/Students with Intellectual Disabilities; *Guidelines:* Teaching Students with Intellectual Disabilities	
• Autism spectrum disorder	*Cluster 5*/Autism Spectrum Disorders	
• Gifts and talents	*Cluster 5*/Students Who Are Gifted and Talented	
3. Legislation and institutional responsibilities relating to exceptional students	*Cluster 5*/Individual Differences and the Law	9(j) The teacher understands laws related to learners' rights and teacher responsibilities (e.g., for educational equity, appropriate education for learners with disabilities, confidentiality, privacy, appropriate treatment of learners, reporting in situations related to possible child abuse).
• Americans with Disabilities Act (ADA), Individuals with Disabilities Education Act (IDEA); Section 504 Protections for Students	*Cluster 5*/IDEA; Section 504 Protections	
• Inclusion, mainstreaming, and least restrictive environment	*Cluster 5*/Individual Differences and the Law; Least Restrictive Environment *Cluster 14*/Reaching Every Student: Differentiation with Universal Design for Learning	
4. Approaches for accommodating various learning styles and intelligences	*Cluster 5*/Learner Differences and Learning Needs—Focus on: Creativity in the Classroom; Learning Styles/Preferences; Individual Differences and the Law; Teaching Students with Gifts and Talents	2(g) The teacher understands and identifies differences in approaches to learning and performance and knows how to design instruction that uses each learner's strengths to promote growth.
• Differentiated instruction	*Cluster 14*/Differentiated Instruction; Assistive Technology; Reaching Every Student: Differentiation with Universal Design for Learning	
• Alternative assessment	*Cluster 15*/Formative and Authentic Classroom Assessments	
• Testing modifications	*Cluster 15*/Reaching Every Student: Helping Students with Disabilities Prepare for High-Stakes Tests	
5. Process of second-language acquisition and strategies to support the learning of students	*Cluster 6*/Basic Communication and Academic Language; Dialect Differences in the Classroom; Teaching English Learners; Teaching Immigrant Students and English Learners; What Is the Best Way to Teach Students Who Are ELs?; Bilingual Education and English Learners	2(i) The teacher knows about second-language-acquisition processes and knows how to incorporate instructional strategies and resources to support language acquisition.

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
6. Understanding of influences of individual experiences, talents, and prior learning, as well as language, culture, family, and community values on students' learning	*Cluster 2/* Who Are You? Who Are Your Students? Culture and Diversity (entire cluster) *Cluster 5*/Learner Differences and Learning Needs	
• Multicultural backgrounds	*Cluster 6*/Teaching Immigrant Students and English Learners *Cluster 2*/Ethnic and Racial Differences in School Achievement; Economic and Social Class Differences; Education Is Cultural; Culturally Relevant Pedagogy; Creating Culturally Welcoming Classrooms; Diversity in Learning; Lessons for Teachers: Teaching Every Student (entire cluster)	2(j) The teacher understands that learners bring assets for learning based on their individual experiences, abilities, talents, prior learning, and peer and social group interactions, as well as language, culture, family, and community values. 2(k) The teacher knows how to access information about the values of diverse cultures and communities and how to incorporate learners' experiences, cultures, and community resources into instruction.
• Age-appropriate knowledge and behaviors	*Cluster 3*/Four Stages of Cognitive Development; Vygotsky's Sociocultural Perspective; Implications of Piaget's and Vygotsky's Theories for Teachers *Cluster 4*/The Self, Social, and Moral Development—Focus on: The Preschool Years: Trust, Autonomy, and Initiative; The Elementary and Middle School Years: Industry Versus Inferiority; Adolescence: The Search for Identity; Understanding Others and Moral Development	
• The student culture at the school	*Cluster 2*/Peer Influences and Resistance Cultures *Cluster 4*/Bronfenbrenner: The Social Context for Development; Peers *Cluster 12*/Learned Helplessness	
• Family backgrounds	*Cluster 4*/Families *Cluster 2*/Poverty and Social Inequality; Poverty and Academic Outcomes *Cluster 4/Guidelines:* Family and Community Partnerships *Cluster 12/Guidelines:* Family and Community Partnerships	
• Linguistic patterns and differences	*Cluster 5*/Students with Communication Impairments *Cluster 6*/The Development of Language; Dialects; What Is Involved in Being Bilingual?	1(g) The teacher understands the role of language and culture in learning and knows how to modify instruction to make language comprehensible and instruction relevant, accessible, and challenging.
• Cognitive patterns and differences	*Cluster 5*/Learning Styles/Preferences *Cluster 8*/Individual Differences in Working Memory; Long-Term Memory *Cluster 9*/Individual Differences in Metacognition	
• Social and emotional issues	*Cluster 4*/Understanding Others and Moral Development *Cluster 5*/Students with Emotional or Behavioral Disorders *Cluster 6*/Affective and Emotional/Social Considerations *Cluster 11*/Self-Regulation of Emotions	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
C. Student Motivation and the Learning Environment		
1. Theoretical foundations about human motivation and behavior	*Cluster 12*/Motivation in Learning and Teaching (entire cluster)	3(i) The teacher understands the relationship between motivation and engagement and knows how to design learning experiences using strategies that build learner self-direction and ownership of learning.
● Important terms that relate to motivation and behavior	*Cluster 7*/Operant Conditioning: Trying New Responses; Reinforcement Schedules *Cluster 11*/Social Cognitive Views of Learning and Motivation *Cluster 12*/Motivation in Learning and Teaching *Cluster 14*/Teacher Expectations	
2. How knowledge of human emotion and behavior should influence strategies for organizing and supporting individual and group work in the classroom	*Cluster 10*/Collaboration and Cooperation; *Guidelines*: Using Cooperative Learning; Designing Interactive Digital Learning Environments *Cluster 11*/Reaching Every Student: Technology and Self-Regulation; *Guidelines*: Encouraging Emotional Self-Regulation; Teaching Toward Self-Efficacy and Self-Regulated Learning *Cluster 12*/Anxiety in the Classroom; Reaching Every Student: Coping with Negative Emotions; *Guidelines:* Coping with Anxiety; *Guidelines:* Supporting Self-Determination and Autonomy; Strategies to Encourage Motivation to Learn *Cluster 14*/Teacher Expectations	3(j) The teacher knows how to help learners work productively and cooperatively with each other to achieve learning goals.
3. Factors and situations that are likely to promote or diminish students' motivation to learning, and how to help students to become self-motivated	*Cluster 11*/*Guidelines*: Encouraging Emotional Self-Regulation; Teaching Toward Self-Efficacy and Self-Regulated Learning *Cluster 12*/Needs: Lessons for Teachers; Goals: Lessons for Teachers; Interest, Curiosity, and Emotions: Lessons for Teachers; Supporting Autonomy	3(i) The teacher understands the relationship between motivation and engagement and knows how to design learning experiences using strategies that build learner self-direction and ownership of learning.
4. Principles of effective management and strategies to promote positive relationships, cooperation, and purposeful learning	*Cluster 7*/Methods for Encouraging Behaviors; *Guidelines:* Applying Operant Conditioning: Encouraging Positive Behaviors; Handling Undesirable Behavior; Reaching Every Student: Positive Behavior Supports; Current Applications: Functional Behavioral Assessment, Positive Behavior Supports, and Self-Management *Cluster 10*/Collaboration and Cooperation; *Guidelines*: Using Cooperative Learning *Cluster 13*/The What and Why of Supportive Classroom Organization; Caring Relationships: Connections with Schools; The Need for Communication; Diversity: Culturally Responsive Management	3(k) The teacher knows how to collaborate with learners to establish and monitor elements of a safe and productive learning environment including norms, expectations, routines, and organizational structures.
● Establishing daily procedures and routines	*Cluster 13*/Routines and Rules Required: In-Person Learning; Routines and Rules Required: Remote Learning; *Guidelines:* Establishing Class Routines for In-Person Learning; *Guidelines*: Establishing Routines and Rules for Remote Learning	
● Establishing classroom rules, punishments, and rewards	*Cluster 13*/Prevention Is the Best Medicine; Reaching Every Student: Restorative Justice *Cluster 14*/Teacher Expectations	
● Giving timely feedback	*Cluster 7*/*Guidelines:* Applying Operant Conditioning: Using Praise Appropriately *Cluster 13*/The Need for Communication *Cluster 14*/Responding to Student Answers *Cluster 15*/Effects of Grading on Students	
● Maintaining accurate records	*Cluster 15*/Authentic Assessments: Performances and Portfolios; *Guidelines:* Creating Portfolios; Evaluating Portfolios and Performances	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
• Communicating with parents and caregivers	*Clusters 3–9, 12–15/Guidelines:* Family and Community Partnerships (one in each cluster)	
• Using objective behavior descriptions	*Cluster 7*/Putting It All Together: Applied Behavior Analysis	
• Responding to student misbehavior	*Cluster 7*/Contingency Contracts, Token Reinforcement, and Group Consequences; Handling Undesirable Behavior; *Guidelines:* Applying Operant Conditioning: Using Punishment *Cluster 13*/Dealing with Discipline Problems; Special Challenges with High School Students; *Guidelines:* Imposing Penalties; Assertive Discipline; Confrontations and Negotiations; *Guidelines:* Handling Potentially Explosive Situations	
• Arranging classroom space	*Cluster 10*/Designing Interactive Digital Learning Environments *Cluster 13*/Planning Spaces for Learning; *Guidelines:* Designing Learning Spaces	
• Pacing and the structure of the lesson	*Cluster 13*/Encouraging Engagement; *Guidelines:* Keeping Students Engaged; Withitness; Overlapping and Group Focus; Movement Management *Cluster 14*/Clarity and Organization; *Guidelines:* Effective Direct Instruction	
II. Instruction and Assessment		
A. Instructional Strategies		
1. Major cognitive processes associated with student learning		
• Critical thinking	*Cluster 9*/Critical Thinking and Argumentation	8(j) The teacher understands the cognitive processes associated with various kinds of learning (e.g., critical and creative thinking, problem framing and problem solving, invention, memorization, and recall) and how these processes can be stimulated.
• Creative thinking	*Cluster 5*/Creativity: What It Is and Why It Matters	
• Inductive and deductive thinking	*Cluster 3*/High School and College: Formal Operations	
• Problem structuring and problem solving	*Cluster 9*/Problem Solving; *Guidelines:* Applying Problem Solving	
• Invention	*Cluster 5*/Creativity: What It Is and Why It Matters	
• Memorization and recall	*Cluster 8*/Cognitive Views of Memory	
2. Major categories, advantages, and appropriate uses of instructional strategies		8(k) The teacher knows how to apply a range of developmentally, culturally, and linguistically appropriate instructional strategies to achieve learning goals.
• Cooperative learning	*Cluster 10*/Collaboration and Cooperation; *Guidelines:* Using Cooperative Learning	
• Direct instruction (often referred to as *teacher-centered instruction*)	*Cluster 14*/Explicit Teaching and Direct Instruction	
• Discovery learning	*Cluster 10*/Inquiry-Based Learning; Problem-Based Learning	
• Whole-group discussion	*Cluster 14*/Group Discussion and Quality Talk; *Guidelines:* Productive Group Discussions	
• Independent study	*Cluster 9*/Learning Strategies; *Guidelines:* Becoming an Expert Student *Cluster 11*/Agency and Self-Efficacy; Self-Regulated Learning: Skill and Will *Cluster 14*/Independent Work and Homework	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
• Interdisciplinary instruction (sometimes referred to as *thematic instruction*)	*Cluster 10*/Inquiry-Based Learning; Problem-Based Learning *Cluster 14*/Planning from a Constructivist Perspective	5(j) The teacher understands how current interdisciplinary themes (e.g., civic literacy, health literacy, global awareness) connect to the core subjects and knows how to weave those themes into meaningful learning experiences.
• Questioning	*Cluster 14*/Questioning, Discussion, Dialogue, and Feedback	
3. Principles, techniques, and methods associated with major instructional strategies		8(k) The teacher knows how to apply a range of developmentally, culturally, and linguistically appropriate instructional strategies to achieve learning goals.
• Direct instruction (often referred to as *teacher-centered instruction*)	*Cluster 14*/Explicit Teaching and Direct Instruction; Questioning, Discussion, Dialogue, and Feedback; Rosenshine's Six Teaching Functions	
• Student-centered models	*Cluster 10*/Cognitive and Social Constructivism	
4. Methods for enhancing student learning through the use of a variety of resources and materials	*Cluster 10*/Designing Interactive Digital Learning Environments *Cluster 14*/Assistive Technology; Reaching Every Student: Differentiation with Universal Design for Learning	8(n) The teacher knows how to use a wide variety of resources, including human and technological, to engage students in learning.
B. Planning Instruction		
1. Techniques for planning instruction to meet curriculum goals, including the incorporation of learning theory, subject matter, curriculum development, and student development		7(i) The teacher understands learning theory, human development, cultural diversity, and individual differences and how these impact ongoing planning.
• National and state learning standards	*Cluster 14*/An Example of State-Level Goals: The Common Core	7(g) The teacher understands content and content standards and how these are organized in the curriculum.
• State and local curriculum frameworks	*Cluster 15*/Accountability and High-Stakes Testing	
• State and local curriculum guides		
• Scope and sequence in specific disciplines	*Cluster 14*/The First Step: Planning; Classroom Goals for Learning; Planning from a Constructivist Perspective	
• Units and lessons		
• Behavioral objectives: affective, cognitive, and psychomotor	*Cluster 14*/Learning Goals; Flexible and Creative Plans—Using Taxonomies; *Guidelines:* Using Learning Objectives	
• Learner objectives and outcomes		
2. Techniques for creating effective bridges between curriculum goals and students' experiences	*Cluster 7*/Beyond Behaviorism: Bandura's Challenge and Observational Learning	7(j) The teacher understands the strengths and needs of individual learners and how to plan instruction that is responsive to these strengths and needs.
• Modeling	*Cluster 11*/Modeling: Learning By Observing Others	
• Guided practice	*Cluster 3*/Assisted Learning *Cluster 10*/Facilitating Deep Learning in a Constructivist Classroom; Cognitive Apprenticeships; Reciprocal Questioning *Cluster 14*/Rosenshine's Six Teaching Functions	
• Independent practice, including homework	*Cluster 11*/Agency and Self-Efficacy; Self-Regulated Learning: Skill and Will *Cluster 14*/Independent Work and Homework	
• Transitions	*Cluster 13*/Overlapping and Group Focus; Movement Management; *Guidelines:* Keeping Students Engaged	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
• Activating students' prior knowledge	*Cluster 8*/The Importance of Knowledge in Cognition; Long-Term Memory *Cluster 9*/Defining Goals and Representing the Problem *Cluster 10*/Scaffolding	
• Anticipating preconceptions	*Cluster 9*/Factors That Hinder Problem Solving	
• Encouraging exploration and problem solving	*Cluster 3*/Implications of Piaget's and Vygotsky's Theories for Teachers *Cluster 9*/Problem Solving *Cluster 11*/Agency and Self-Efficacy	
• Building new skills on those previously acquired	*Cluster 3*/Basic Tendencies in Thinking *Cluster 5*/Students with Intellectual Disabilities; *Guidelines:* Teaching Students with Intellectual Disabilities *Cluster 8*/Long-Term Memory; Constructing Declarative Knowledge: Making Meaningful Connections; Development of Procedural Knowledge *Cluster 10*/Scaffolding *Cluster 11*/Observational Learning in Teaching	
C. Assessment Strategies		
1. Types of assessments	*Cluster 15*/Norm-Referenced Versus Criterion-Referenced Grading; Formative and Authentic Classroom Assessments; Classroom Assessment: Testing	6(j) The teacher understands the differences between formative and summative applications of assessment and knows how and when to use each.
2. Characteristics of assessments	*Cluster 15*/Basics of Assessment; Assessing the Assessments: Reliability and Validity; Writing Multiple-Choice Questions; Constructed Responses: Essay Testing; Reliability, Validity, Generalizability; *Guidelines:* Developing a Rubric	6(k) The teacher understands the range of types and multiple purposes of assessment and how to design, adapt, or select appropriate assessments to address specific learning goals and individual differences, and to minimize sources of bias.
3. Scoring assessments	*Cluster 15*/Using Multiple-Choice Tests; Evaluating Essays; Evaluating Portfolios and Performances; *Guidelines:* Developing a Rubric	
4. Uses of assessments	*Cluster 15*/Norm-Referenced Versus Criterion-Referenced Grading; Accountability and High-Stakes Testing; Formative and Authentic Classroom Assessments; Classroom Assessment: Testing	6(l) The teacher knows how to analyze assessment data to understand patterns and gaps in learning, to guide planning and instruction, and to provide meaningful feedback to all learners.
5. Understanding of measurement theory and assessment-related issues	*Cluster 15*/Norm-Referenced Versus Criterion-Referenced Grading	
III. Communication Techniques		
A. Basic, effective verbal and nonverbal communication techniques	*Cluster 13*/The Need for Communication; Prevention Is the Best Medicine	8(m) The teacher understands how multiple forms of communication (oral, written, nonverbal, digital, visual) convey ideas, foster self-expression, and build relationships.
B. Effect of cultural and gender differences on communications in the classroom	*Cluster 6*/Dialect Differences in the Classroom *Cluster 2*/Sociolinguistics; Gender in Teaching and Learning; Creating Culturally Welcoming Classrooms	3(l) The teacher understands how learner diversity can affect communication and knows how to communicate effectively in differing environments.
C. Types of questions that can stimulate discussion in different ways for different purposes	*Cluster 10*/Facilitating Deep Learning in a Constructivist Classroom *Cluster 14*/Questioning, Discussion, Dialogue, and Feedback	

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
1. Probing for learner understanding	*Cluster 10*/Facilitating Through Asking and Answering Deep Questions; *Guidelines*: Facilitating Deep Questioning *Cluster 14*/Questioning, Discussion, Dialogue, and Feedback	
2. Helping students articulate their ideas and thinking processes	*Cluster 9*/*Guidelines:* Applying Problem Solving *Cluster 14*/Group Discussion and Quality Talk; *Guidelines:* Productive Group Discussions	5(n) The teacher understands communication modes and skills as vehicles for learning (e.g., information gathering and processing) across disciplines as well as vehicles for expressing learning.
3. Promoting risk taking and problem solving	*Cluster 9*/Problem Solving	8(j) The teacher understands the cognitive processes associated with various kinds of learning (e.g., critical and creative thinking, problem framing and problem solving, invention, memorization, and recall) and how these processes can be stimulated.
4. Facilitating factual recall	*Cluster 14*/Questioning, Discussion, Dialogue, and Feedback	
5. Encouraging convergent and divergent thinking	*Cluster 5*/Assessing Creativity *Cluster 14*/Kinds of Questions	
6. Stimulating curiosity	*Cluster 12*/Tapping Interests; *Guidelines:* Building on Students' Interests and Curiosity; Curiosity: Novelty and Complexity	
7. Helping students to question	*Cluster 10*/Facilitating Through Asking and Answering Deep Questions; *Guidelines*: Facilitating Deep Questioning *Cluster 14*/Fitting the Questions to the Students—and Waiting	
IV. Profession and Community		
A. The Reflective Practitioner		
1. Types of resources available for professional development and learning Professional literature Colleagues	*Clusters 1–15*/*Teachers' Casebook* (opening and closing sections of each cluster)	
2. Ability to read and understand articles about current views, ideas, and debates regarding best teaching practices	*Cluster 1*/Using Research to Understand and Improve Learning *Clusters 1–15*/*Point*/*Counterpoint* (one in each cluster)	
3. Why personal reflection on teaching practices is critical, and approaches that can be used to achieve this	*Clusters 1–15*/*Point*/*Counterpoint* (one in each cluster)	9(g) The teacher understands and knows how to use a variety of self-assessment and problem-solving strategies to analyze and reflect on his/her practice and to plan for adaptations/adjustments.
B. The Larger Community		
1. Role of the school as a resource to the larger community	*Cluster 2*/Who Are You? Who Are Your Students? Culture and Diversity *Cluster 13*/Caring Relationships: Connections with School	10(1) The teacher understands schools as organizations within historical, cultural, political, and social contexts and knows how to work with others across the system to support learners.
2. Factors in the students' environment outside of school (family circumstances, community environments, health, and economic conditions) that may influence students' life and learning	*Cluster 2*/Economic and Social Class Differences *Cluster 4*/Families; Peers *Cluster 5*/Students with Learning Challenges	10(m) The teacher understands that alignment of family, school, and community spheres of influence enhances student learning and that discontinuity in these spheres of influence interferes with learning.

PRAXIS II® TOPICS	WOOLFOLK AND USHER TEXT CONNECTIONS	INTASC ESSENTIAL KNOWLEDGE INDICATORS
3. Basic strategies for involving parents/guardians and leaders in the community in the educational process	*Cluster 2*/Who Are You? Who Are Your Students? Culture and Diversity *Clusters 3–9, 12–15/Family and Community Partnerships* (one in each cluster)	10(n) The teacher knows how to work with other adults and has developed skills in collaborative interaction appropriate for both face-to-face and virtual contexts.
4. Major laws related to students' rights and teacher responsibilities ● Equal education ● Appropriate education for handicapped children ● Confidentiality and privacy ● Appropriate treatment of students	*Cluster 5*/Individual Differences and the Law; The Rights of Students and Families *Cluster 13*/The Need for Communication	9(j) The teacher understands laws related to learners' rights and teacher responsibilities (e.g., for educational equity, appropriate education for learners with disabilities, confidentiality, privacy, appropriate treatment of learners, reporting in situations related to possible child abuse).
Reporting situations related to possible child abuse	*Cluster 4*/Teachers and Child Abuse *Cluster 4*/Mandated Reporting	

Note: *The InTASC (Interstate Teacher Assessment and Support Consortium) standards were developed by the Council of Chief State School Officers and member states. Copies may be downloaded from the council's website at* http://www.ccsso.org.

Source: Council of Chief State School Officers. (2013, April). *Interstate Teacher Assessment and Support Consortium InTASC Model Core Teaching Standards and Learning Progressions for Teachers 1.0: A Resource for Ongoing Teacher Development.* Washington, DC: Author.

Glossary

Absence seizure A seizure involving only a small part of the brain and that causes a child to lose contact briefly with ongoing events—short lapses of consciousness.

Academic language The entire range of language used in elementary, secondary, and university-level schools, including words, concepts, strategies, and processes from academic subjects.

Academic learning time Time when students are actually succeeding at the learning task.

Accommodation Altering existing schemes or creating new ones in response to new information.

Accountable Making teachers and schools responsible for student learning, usually by monitoring learning with high-stakes tests.

Acronym Technique for remembering by using the first letter of each word in a phrase to form a new, memorable word.

Action research Systematic observations or tests of methods conducted by teachers or schools to improve teaching and learning for their students.

Active teaching Teaching characterized by high levels of teacher explanation, demonstration, and interaction with students.

Adaptation Adjustment to the environment.

Adolescent egocentrism Assumption that everyone else shares one's thoughts, feelings, and concerns.

Advance organizer A statement or tool that introduces and summarizes concepts to help students organize the information they will learn about.

Affective domain Objectives focusing on attitudes and feelings.

Affinity groups Online communities for video-game users where they can share knowledge, strategies, role-play scenarios, game modifications, or fan fiction stories and novels based on the games they are playing.

Algorithm Step-by-step procedure for solving a problem; prescription for solutions.

Ambitious teaching An approach to teaching grounded in challenging goals, complex but engaging tasks, and high-quality discussions building on students' ideas.

Americans with Disabilities Act of 1990 (ADA) Federal legislation prohibiting discrimination against individuals with disabilities in employment, transportation, public access, local government, and telecommunications.

Amotivation A complete lack of any intent to act—no engagement at all.

Analogical thinking Heuristic in which one limits the search for solutions to situations that are similar to the one at hand.

Anorexia nervosa Eating disorder characterized by very limited food intake.

Antecedents Events that precede an action.

Anxiety General uneasiness, a feeling of tension.

Applied behavior analysis The application of behavioral learning principles to understand and change behavior.

Appropriating Being able to internalize or take for yourself knowledge and skills developed in interaction with others or with cultural tools.

Argumentation The process of debating a claim with someone else.

Articulation disorders Any of a variety of pronunciation difficulties, such as the substitution, distortion, or omission of sounds.

Assertive discipline Clear, firm, nonhostile response style.

Assessment Procedures used to obtain information about student performance.

Assessment bias Qualities of an assessment instrument that offend or unfairly penalize a group of students because of the students' gender, socioeconomic status, race, ethnicity, and so on.

Assimilation Fitting new information into existing schemes.

Assisted learning Providing strategic help in the initial stages of learning, gradually diminishing that help as students gain independence.

Assistive technology Devices, systems, and services that support and improve the capabilities of individuals with disabilities.

Attachment Forming an emotional bond with another person, initially a parent or family member.

Attention Focus on a stimulus.

Attention-deficit hyperactivity disorder (ADHD) Current term for disruptive behavior disorders marked by overactivity, excessive difficulty sustaining attention, or impulsiveness.

Attribution theories Descriptions of how individuals' explanations, justifications, and excuses influence their motivation and emotion.

Authentic assessments Assessment procedures that test skills and abilities as they would be applied in real-life situations.

Authentic questions Questions that the teachers do not have a predetermined answer for.

Authentic task Tasks that have some connection to real-life problems the students will face outside the classroom.

Autism spectrum disorders Set of developmental disabilities significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, and ranging from mild to major.

Automated basic skills Skills that are applied without conscious thought.

Automaticity The ability to thoroughly perform learned tasks without much mental effort. The result of learning to perform a behavior or thinking process so thoroughly that the performance is automatic and does not require effort.

Autonomy Independence.

Availability heuristic Judging the likelihood of an event based on what is available in your memory, assuming those easily remembered events are common.

Balanced bilingualism Adding a second language capability without losing your heritage language.

Basic skills Clearly structured knowledge that is needed for later learning and that can be taught step-by-step.

Behavioral learning theories Explanations of learning that focus on external events as the cause of changes in observable behaviors.

Being needs Maslow's three higher-level needs, sometimes called *growth needs.*

Belief perseverance The tendency to hold on to beliefs, even in the face of contradictory evidence.

Bias A prejudicial preference or action.

Bilingual Speaking two languages and dealing appropriately with the two different cultures.

Binge eating disorder Uncontrolled eating of large quantities of food, such as a whole cake or entire jar of peanut butter.

Bioecological model Bronfenbrenner's theory describing the nested social and cultural contexts that shape development. Every person develops within a *microsystem* inside a *mesosystem* that is embedded in an *exosystem*—all of which are a part of the *macrosystem* of the culture. All development occurs in and is influenced by the time period—the *chronosystem*.

Blended families Parents, children, and stepchildren merged into families through remarriages.

Bottom-up processing Perceiving based on noticing separate defining features and assembling them into a recognizable pattern.

Brainstorming Generating ideas without stopping to evaluate them.

Bulimia nervosa Eating disorder characterized by overeating and then getting rid of the food by self-induced vomiting or laxatives.

CAPS A strategy that can be used in reading literature: *Characters, Aim* of story, *Problem, Solution*.

Case study Intensive study of one individual or one situation.

Central executive The part of working memory that is responsible for monitoring and directing attention and other mental resources.

Central tendency Typical score for a group of scores.

Cerebral palsy Condition involving a range of motor or coordination difficulties due to brain damage.

Chain mnemonics Memory strategies that associate one element in a series with the next element.

Chunking Grouping individual bits of data into meaningful, larger units.

Classical conditioning Association of automatic responses with new stimuli.

Classification Grouping objects into categories.

Classroom assessments Classroom assessments are selected and created by teachers and can take many different forms—unit tests, essays, portfolios, projects, performances, oral presentations, and so on.

Classroom management Techniques used to maintain a healthy learning environment, relatively free of behavior problems.

Cmaps Tools for concept mapping developed by the Institute for Human and Machine Cognition that are connected to many knowledge maps and other resources on the Internet.

Coactions Joint actions of individual biology and the environment—each shapes and influences the other.

Co-constructed process A social process in which people interact and negotiate (usually verbally) to create an understanding or to solve a problem. The final product is shaped by all participants.

Code switching Moving between two speech forms.

Cognitive apprenticeship A relationship in which a less experienced learner acquires knowledge and skills under the guidance of an expert.

Cognitive development Gradual, orderly changes by which mental processes become more complex and sophisticated.

Cognitive domain In Bloom's taxonomy, memory and reasoning objectives.

Cognitive load The volume of cognitive resources necessary to complete a task.

Cognitive science The interdisciplinary study of thinking, language, artificial intelligence (AI), and the brain.

Cognitive view of learning A general approach that views learning as an active mental process of acquiring, remembering, and using knowledge.

Collaboration A philosophy about how to relate to others—how to learn and work together.

Collective monologue Form of speech in which children in a group talk but do not really interact or communicate.

Commitment In Marcia's theory of identity statuses, individuals' choices concerning political and religious beliefs, for example, usually as a consequence of exploring the options.

Community of practice Social situation or context in which ideas are judged useful or true.

Compensation The principle that changes in one dimension can be offset by changes in another dimension.

Complex learning environments Problems and learning situations that mimic the ill-structured nature of real life.

Computational thinking The thought processes involved in formulating problems so you can represent their solution steps and algorithms for computing.

Computerized axial tomography (CAT) A technique that uses X-ray technology to provide enhanced, three-dimensional images of the part of the body scanned.

Concept A category used to group similar events, ideas, objects, or people.

Concept map A drawing that charts the relationships among ideas.

Concrete operations Mental tasks tied to concrete objects and situations.

Conditioned response (CR) Learned response to a previously neutral stimulus.

Conditioned stimulus (CS) Stimulus that evokes an emotional or physiological response after conditioning.

Confidence interval Range of scores within which an individual's true score is likely to fall.

Confirmation bias Seeking information that confirms our choices and beliefs while ignoring disconfirming evidence.

Consequences Events that follow an action.

Conservation Principle that some characteristics of an object remain the same despite changes in its appearance.

Constructive/Structured controversy Students work in cooperative groups to research a particular controversy.

Constructivism/Constructivist approach View that emphasizes the active role of the learner in building understanding and making sense of information.

Context Internal and external circumstances and situations that interact with the individual's thoughts, feelings, and actions to shape development and learning. The physical or emotional backdrop associated with an event.

Contiguity Association of two events because of repeated pairing.

Contingency contract A contract between the teacher and a student specifying what the student must do to earn a particular reward or privilege.

Continuous reinforcement schedule Presenting a reinforcer after every appropriate response.

Convergent questions Questions with only one right answer—usually factual questions or rote knowledge questions.

Convergent thinking Narrowing possibilities to a single answer.

Cooperation Way of working with others to attain a shared goal.

Cooperative learning Situations in which elaboration, interpretation, explanation, and argumentation are integral to the activity of the group and where learning is supported by other individuals.

Co-regulated learning Process of sharing the regulation of learning, behaviors, motivation, and emotions among group members.

Co-regulation A transitional phase during which students gradually appropriate self-regulated learning and skills through modeling, direct teaching, feedback, and coaching from teachers, parents, or peers.

Correlations Statistical descriptions of how closely two variables are related.

Creativity Imaginative, original thinking or problem solving.

Criterion-referenced grading Assessment of each student's mastery of course objectives.

Criterion-referenced testing Testing in which scores are compared to a set performance standard.

Critical periods If learning doesn't happen during these periods, it never will.

Critical thinking Evaluating conclusions by logically and systematically examining the problem, the evidence, and the solution.

Crystallized intelligence Ability to apply culturally approved problem-solving methods.

Cueing Providing a stimulus that "sets up" a desired behavior.

Cultural deficit model A model that explains the school achievement problems of ethnic minority students by assuming that their cultures are inadequate and does not prepare the students to succeed in school.

Cultural tools The real tools (computers, scales, etc.) and symbol systems (numbers, language, graphs) that allow people in a society to communicate, think, solve problems, and create knowledge.

Culturally relevant pedagogy Excellent teaching that supports students' cultural identities by promoting academic success, developing/maintaining cultural competence, and developing a critical consciousness to challenge the status quo.

Culturally responsive classroom management Taking cultural meanings and styles into account when developing management plans and responding to students.

Culture The knowledge, values, attitudes, and traditions that guide the behavior of a group of people and allow them to solve the problems of living in their environment.

Cyber aggression Using email, Twitter, Facebook, Instagram, or other social media to spread rumors, make threats, or otherwise terrorize peers.

Decay The weakening and fading of memories with the passage of time.

Decentering Focusing on more than one aspect at a time.

Declarative knowledge Verbal information; facts; "knowing that" something is the case.

Deficiency needs Maslow's four lower-level needs, which must be satisfied first before higher-level needs can be addressed.

Defining attribute Qualities that connect members of a group to a specific concept.

Deliberate practice Becoming expert in a skill that has clear criteria by focusing on the discrepancies between your current skill level and expert performance and working persistently to improve your performance, usually with guidance and feedback from an expert coach.

Descriptive studies Studies that collect detailed information about specific situations, often using observation, surveys, interviews, recordings, or a combination of these methods.

Design-based research Practitioners identify research questions based on problems of practice; then researchers gather and analyze the data to address those problems.

Desirable difficulty The more effort that is required to remember something, the better you will learn and the stronger the memory will be—as long as the efforts are successful.

Development Orderly, adaptive changes we go through between conception and death; these developmental changes remain for a reasonably long period of time.

Developmental crisis A specific conflict whose resolution prepares the way for the next stage.

Deviation IQ Score based on a statistical comparison of an individual's performance with the average performance of others in that age group.

Dialect Any variety of a language spoken by a particular group.

Differentiated instruction A flexible approach to teaching that matches content, process, and product based on student differences in readiness, interests, and learning needs. Takes into account students' abilities, prior knowledge, and challenges so that instruction matches not only the subject being taught but also students' needs.

Direct instruction/Explicit teaching Systematic instruction for mastery of basic skills, facts, and information.

Direct reinforcement Reinforcement given after successful completion of a task.

Disability The inability to do something specific such as walk or hear.

Discrimination Treating unfairly or acting unfairly toward particular categories of people.

Disequilibrium In Piaget's theory, the "out-of-balance" state that occurs when an individual realizes that his or her current ways of thinking are not working to solve a problem or understand a situation.

Distractors Wrong answers offered as choices in a multiple-choice item.

Distributed learning/practice Practice in brief periods with rest intervals.

Distributive justice Beliefs about how to divide materials or privileges fairly among members of a group; follows a sequence of development from equality to merit to benevolence.

Divergent questions Questions that have no single correct answer.

Divergent thinking Coming up with many possible solutions.

Domain-specific knowledge Information that is useful in a particular situation or that applies mainly to one specific topic.

Domain-specific strategies Consciously applied skills to reach goals in a particular subject or problem.

Dual coding theory Suggests that information is stored in long-term memory as either visual images or verbal units, or both.

Educational psychology The discipline concerned with teaching and learning processes; applies the methods and theories of psychology and has its own as well.

Effective instruction delivery (EID) Instructions that are concise, clear, and specific, and that communicate an expected result. Statements work better than questions.

Egocentric Assuming that others experience the world the way you do.

Elaboration Adding and extending meaning by connecting new information to existing knowledge.

Elaborative rehearsal Keeping information in working memory by associating it with something else you already know.

Electroencephalograph (EEG) A technique that measures electrical patterns in the brain created by neuron movements using electrodes attached to the scalp.

Embodied cognition Theory stating that cognitive processes develop from real-time, goal-directed interactions between humans and their environment.

Emergent literacy The skills and knowledge, usually developed in the preschool years, that are the foundation for the development of reading and writing.

Emotional Intelligence (EI) The abilities to monitor your own and other people's feelings, to discriminate among different feelings, and to use this information to guide your own thinking, decisions, and actions.

Emotional and behavioral disorders Behaviors or emotions that deviate so much from the norm that they interfere with the child's own growth and development and/or the lives of others—inappropriate behaviors, unhappiness or depression, fears and anxieties, and trouble with relationships.

Emotions Three interrelated factors—physiological responses, behaviors, and feelings—that produce an affective response to a situation.

Empathetic listening Hearing the intent and emotions behind what another says and reflecting them back by paraphrasing.

Empirical Based on systematically collected data.

Enactive learning Learning by doing and experiencing the consequences of your actions.

EMR model A research-based strategy for developing positive relationships with students. EMR stands for Establish-Maintain-Restore.

Engaged time Time spent actively engaged in the learning task at hand. Also referred to as *time on task.*

English as a second language (ESL) The classes devoted to teaching English to students who are English learners.

English learners (ELs) Students who are learning English and whose primary or heritage language is not English.

Epilepsy Disorder marked by seizures and caused by abnormal electrical discharges in the brain.

Episodic buffer The process that brings together and integrates information from the phonological loop, visuo-spatial sketchpad, and long-term memory under the supervision of the central executive.

Episodic memory Long-term memory for information tied to a particular time and place, especially memory of the events in a person's life.

Equilibration Search for mental balance between cognitive schemes and information from the environment.

Ethnic-racial identity The beliefs, feelings, significance, and meaning people have about their ethnicity or race.

Ethnicity A cultural heritage shared by a group of people.

Ethnography A descriptive approach to research that focuses on life within a group and tries to understand the meaning of events to the people involved.

Event-related potential (ERP) Measurements that assess electrical activity of the brain through the skull or scalp.

Exceptional students Students who fall outside the typical range of development and require special educational services to reach their full potential.

Executive control processes Processes such as selective attention, rehearsal, elaboration, and organization that influence encoding, storage, and retrieval of information in memory.

Executive functioning All those processes that we use to organize, coordinate, and perform goal-directed, intentional actions, including focusing attention, inhibiting impulsive responses, making and changing plans, and using memory to hold and manipulate information.

Exemplar An actual memory of a specific object.

Expectancy for success Students' beliefs about how well they will perform on an upcoming task.

Expectancy × value theories Explanations of motivation that emphasize individuals' expectations for success combined with their valuing of the goal.

Experimentation Research method in which variables are manipulated and the effects recorded.

Expert teachers Experienced, effective teachers who have developed solutions for classroom problems. Their knowledge of the teaching process and content is extensive and well organized.

Explicit memory Long-term memories that involve deliberate or conscious recall.

Exploration In Marcia's theory of identity statuses, the process by which adolescents consider and try out alternative beliefs, values, and behaviors in an effort to determine which will give them the most satisfaction.

Expressive vocabulary All the different words a person uses in speaking or writing.

Extended families Different family members—grandparents, aunts, uncles, cousins, and so on—living in the same household or at least in daily contact with the children in the family.

Extinction The disappearance of a learned response.

Extraneous cognitive load The resources required to process stimuli irrelevant to the task.

Extrinsic motivation Motivation created by external factors such as rewards and punishments.

Fixed mindset A personally held belief that abilities are stable, uncontrollable, set traits.

Flashbulb memories Clear, vivid memories of emotionally important events in your life.

Flexible grouping Grouping and regrouping students based on learning needs.

Flow A mental state in which you are fully immersed in a challenging task that is accompanied by high levels of concentration and involvement.

Fluency disorder A language disorder characterized by disruptions in the production of speech sounds, commonly called stuttering.

Fluid intelligence Mental efficiency; nonverbal abilities grounded in brain development.

Flynn effect Because of better health, smaller families, increased complexity in the environment, and more and better schooling, IQ test scores are steadily rising.

Focal onset seizure A seizure originating in just one area of the brain lasting only a minute or two. The person may experience a sudden feeling of joy, sadness, anger, or nausea, or sensations such as taste, smell, or movement in one part of the body.

Formal operations Mental tasks involving abstract thinking and coordination of several variables.

Formative assessment Ungraded testing used before or during instruction to aid in planning and diagnosis.

Free, appropriate public education (FAPE) Public funding to support appropriate educational programs for all students no matter their needs.

Functional behavioral assessment (FBA) Procedures used to obtain information about antecedents, behaviors, and consequences to determine the reason or function of the behavior.

Functional fixedness Inability to use objects or tools in a new way.

Functional magnetic resonance imaging (fMRI) An MRI is an imaging technique that uses a magnetic field along with radio waves and a computer to create detailed pictures of the inside of the body. A functional MRI uses an MRI to measure the tiny changes that take place in the brain during brain activity.

Funds of knowledge Knowledge that families and community members have acquired in many areas of work, home, and religious life that can become the basis for teaching.

Gender biases Different views of men, women, or gender-nonconforming people often favoring one group over the other.

Gender identity The sense of self along the female-to-male continuum or as neither female nor male (i.e., nonbinary).

Gender roles The behaviors and characteristics that the culture stereotypically associates with being a man or a woman.

Gender schemas Organized cognitive structures that include gender-related information that influences how children think and behave.

Genderlects Different ways of talking for men and women.

General intelligence (*g*) A general factor in cognitive ability that is related in varying degrees to performance on all mental tests.

General knowledge Information that is useful in many different kinds of tasks; information that applies to many situations.

Generalized onset seizure A seizure involving a large portion of the brain.

Generation 1.5 Students whose characteristics, educational experiences, and language fluencies are somewhere in between those of students born in the United States and those of students who are recent immigrants.

Generativity Sense of concern for future generations.

Gestalt German for *pattern* or *configuration*. Gestalt theorists hold that people organize their perceptions into coherent wholes.

Gifted and talented Students who demonstrate outstanding aptitudes and competencies in one or more of many domains.

Glial cells The *white matter* of the brain. These cells greatly outnumber neurons and appear to have many functions such as fighting infections, controlling blood flow and communication among neurons, and providing the *myelin* coating around axon fibers.

Goal orientations Patterns of beliefs about goals related to achievement in school.

Goal-directed actions Deliberate actions toward a goal.

Good behavior game Arrangement where a class is divided into teams and each team receives demerit points for breaking agreed-upon rules of good behavior.

Grade-equivalent score Measure of grade level based on comparison with norming samples from each grade.

Grading on the curve Norm-referenced grading that compares students' performance to an average level.

Grit A personality trait characterized by passion and persistence to meet long-term goals.

Group consequences Rewards or punishments given to a class as a whole for adhering to or violating rules of conduct.

Group discussion Conversation in which the teacher does not have the dominant role; students pose and answer their own questions.

Group focus The ability to keep as many students as possible involved in activities.

Growth mindset A personally held belief that abilities are unstable, controllable, and improvable.

Handicap A disadvantage in a particular situation, sometimes caused by a disability.

Heritage language The language spoken in the student's home or by members of the student's family.

Heuristic General strategy used in attempting to solve problems.

Hierarchy of needs Maslow's model of seven levels of human needs, from basic physiological requirements to the need for self-actualization.

High-stakes testing Standardized tests whose results have powerful influences when used by school administrators, other officials, or employers to make decisions.

Hostile aggression Bold, direct action that is intended to hurt someone else; unprovoked attack.

Human agency The capacity to coordinate learning skills, motivation, and emotions to reach your goals.

Hypothesis/hypotheses A prediction of what will happen in a research study based on theory and previous research.

Hypothetico-deductive reasoning A formal-operations problem-solving strategy in which an individual begins by identifying all the factors that might affect a problem and then deduces and systematically evaluates specific solutions.

"I" message Clear, nonaccusatory statement of how something is affecting you.

Identity Principle that an individual or object remains the same over time. The complex answer to the question: "Who am I?"

Identity achievement Strong sense of commitment to life choices after free consideration of alternatives.

Identity diffusion Uncenteredness; confusion about who you are and what you want.

Identify-first reference Using terms such as "autistic" or "deaf" to describe a person—some people prefer this reference because they "claim" the disability as their own and value it as a part of who they are. It is a source of pride to be part of that culture.

Identity foreclosure Acceptance of parental life choices without considering options.

Images Representations based on the physical attributes—the appearance—of information.

Immersive virtual learning environment (IVLE) A simulation of a real-world environment that immerses students in tasks like those required in a professional practicum.

Immigrants People who voluntarily leave their country to become permanent residents in a new place.

Impairment Any loss or abnormality in a physical or psychological structure or function.

Implicit memory Knowledge that we are not conscious of recalling but that influences our behavior or thought without our awareness.

Importance or attainment value The importance of doing well on a task; how success on the task meets personal or identity-based needs.

Incentive An object or event that encourages or discourages behavior.

Inclusion The integration of all students, including those with severe disabilities, into regular classes.

Individualized education program (IEP) Annually revised program for an exceptional student that details the present achievement level, goals, and strategies and is drawn up by teachers, parents, specialists, and (if possible) the student.

Individuals with Disabilities Education Act (IDEA) Latest amendment of PL 94–142; guarantees a free public education to all children regardless of disability.

Industry Eagerness to engage in productive work.

Informal assessments Ungraded (formative) assessments that gather information from multiple sources to help teachers make decisions.

Information processing The human mind's activity of taking in, storing, and using information.

Initiative Willingness to begin new activities and explore new directions.

Inquiry learning Approach in which the teacher presents a puzzling situation or question and students solve the problem by gathering data and testing their conclusions.

Insight In problem solving, the sudden realization of a solution. In the triarchic theory of intelligence, the ability to deal effectively with novel situations.

Instrumental aggression Strong actions aimed at claiming an object, place, or privilege—not intended to harm but may lead to harm.

Integration Fitting the child with special needs into existing class structures.

Integrity Sense of self-acceptance and fulfillment.

Intellectual disabilities Significantly below-average intellectual and adaptive social behavior, evident before age 18.

Intelligence Ability or abilities to acquire and use knowledge for solving problems and adapting to the world.

Intelligence quotient (IQ) Score comparing mental and chronological ages.

Interest or intrinsic value The enjoyment a person gets from a task.

Interference The process that occurs when remembering certain information is hampered by the presence of other information.

Interim (growth or benchmark) assessments Assessments that occur at regular intervals during the school year to determine student progress and growth in an objective way.

Interleaved practice Mixing up practice by, for example, tossing from 2 and 4 feet before being tested at 3 feet, solving different types of problems, or practicing different vocabulary words.

Intermittent reinforcement schedule Presenting a reinforcer after some but not all responses.

Internalize Process whereby children adopt external standards as their own.

Intersectionality Our overlapping, intersecting social identities (gender, sexual orientation, class, ethnicity, religion, age, etc.) that shape each and every one of us in unique ways.

Interval schedule Length of time between reinforcers. Reinforcement based on time between responses.

Intimacy Forming close, enduring relationships with others.

Intrinsic cognitive load The resources required by the task itself, regardless of other stimuli.

Intrinsic motivation Motivation associated with activities that are internally rewarding.

Jason Flatt Act Legislation passed in 20 states that requires educators to complete in-service training about awareness and prevention of death by suicide.

Jigsaw classroom A learning process in which each student is part of a group and each group member is given part of the material to be learned by the whole group. Students become "expert" on their piece and then teach it to the others in their group.

Keyword method System of associating new words or concepts with similar-sounding cue words and images.

KWL A strategy to guide reading and inquiry: Before—What do I already *know*? What do I *want* to know? After—What have I *learned*?

Lateralization The specialization of the two hemispheres (sides) of the brain cortex.

Learned helplessness The expectation, based on previous experiences with a lack of control, that all of one's efforts will lead to failure.

Learning Process through which experience causes permanent change in knowledge or behavior.

Learning management system (LMS) Systems that deliver e-learning, provide tools and learning materials, keep records, administer assessments, and manage learning.

Learning preferences Preferred ways of studying and learning, such as using pictures instead of text, working with other people versus working alone, learning in structured or in unstructured situations, and so on.

Learning sciences An interdisciplinary science of learning, based on research in psychology, education, computer science, philosophy, sociology, anthropology, neuroscience, and other fields that study learning.

Learning strategies A special kind of procedural knowledge—*knowing how* to approach learning tasks.

Learning styles Characteristic approaches to learning and studying.

Least restrictive environment (LRE) Educating each child with peers in the general education classroom to the greatest extent possible.

Legally blind Seeing at 20 feet what a person with normal vision can see at 200 feet and/or having severely restricted peripheral vision.

Lesson study As a group, teachers develop, test, improve, and retest lessons until they are satisfied with the final version.

Levels of processing theory Theory that recall of information is based on how deeply it is processed.

Limited English proficient (LEP) A term also used for students who are learning English when their primary or heritage language is not English—not the preferred term because of the negative connotations. Use *English learner (EL)* instead.

Loci method Technique of associating items with specific places.

Locus of causality The location—internal or external—of the cause of behavior.

Long-term memory Permanent store of knowledge.

Low vision Vision limited to close objects.

Mainstreaming Teaching children with disabilities in regular classes for part or all of their school days.

Maintenance rehearsal Keeping information in working memory by repeating it to yourself.

Mandated Reporting By law, teachers and other professionals who have frequent contact with children must report suspected child abuse and neglect.

Massed practice Practice for a single extended period.

Massive multi-player online games (MMOs) Interactive gaming environments constructed in virtual worlds with many players who may assume character roles or avatars.

Mastery experiences Students' awareness of their own previous successful performance—the most powerful source of efficacy information.

Mastery goal A personal intention to improve abilities and learn, no matter how performance suffers.

Maturation Genetically programmed, naturally occurring changes over time.

Mean Arithmetical average.

Means-ends analysis Heuristic in which a goal is divided into subgoals.

Measurement An evaluation expressed in quantitative (number) terms.

Median Middle score in a group of scores.

Melting pot A metaphor for the absorption and assimilation of immigrants into the mainstream of society so that ethnic differences vanish.

Menarche The first menstrual period in girls.

Mental age In intelligence testing, a performance that represents average abilities for an age group.

Meta-analysis An integration and summary of many individual studies to synthesize the outcomes into one result that characterizes the findings from the studies.

Metacognition Knowledge about your own thinking processes and how to control them along with the skills to regulate your thinking.

Metalinguistic awareness Understanding your own use of language.

Mirror systems Areas of the brain that fire both during perception of an action by someone else and when performing the action.

Mnemonics Techniques for remembering; the art of memory.

Mobile learning Learning that takes place across contexts through the use of personal electronic devices.

Mode Most frequently occurring score.

Modeling Changes in behavior, thinking, or emotions that happen through observing another person—a model.

Monolingual Speaking only one language.

Moral dilemma Situations in which no choice is clearly and indisputably right.

Moral realism Stage of development wherein children see rules as absolute.

Moral reasoning The thinking process involved in judgments about questions of right and wrong.

Morality of cooperation Stage of development wherein children realize that people make rules and people can change them.

Moratorium Identity crisis; suspension of choices because of struggle.

Motivation An internal state that arouses, directs, and maintains behavior.

Motivation to learn The tendency to find academic activities meaningful and worthwhile and to try to benefit from them.

Movement management Keeping lessons and the group moving at an appropriate (and flexible) pace, with smooth transitions and variety.

Multicultural education Education that promotes equity in the schooling of all students and challenges racism and other forms of discrimination.

Multiple representations of content Considering problems using various analogies, examples, and metaphors.

Myelination The process by which neural fibers are coated with a fatty sheath called *myelin* that makes message transfer more efficient.

Natural/logical consequences Instead of punishing, have students redo, repair, or in some way face the consequences that naturally flow from their actions.

Near-infrared optical tomography (NIR-OT) A technique that uses an optical fiber to transmit near-infrared light through the scalp and into the brain. Some of the light is reflected back, indicating blood flow and oxygenation in the blood, which reveals brain activity.

Need for autonomy The desire to have our own wishes, rather than external rewards or pressures, determine our actions.

Need for competence The desire to demonstrate ability or mastery over the tasks at hand.

Need for relatedness The desire to belong and to establish close emotional bonds and attachments with others who care about us.

Negative correlation A relationship between two variables in which a high value on one is associated with a low value on the other. Example: height and distance from top of head to the ceiling.

Negative reinforcement Strengthening behavior by removing an aversive stimulus when the behavior occurs.

Neo-Piagetian theories More recent theories that integrate findings about attention, memory, and strategy use with Piaget's insights about children's thinking and the construction of knowledge.

Neurogenesis The production of new neurons.

Neurons Nerve cells that store and transfer information.

Neutral stimulus Stimulus not connected to a response.

Nigrescence The process of developing a Black racial identity.

Nondiscriminatory evaluations A basic principle of the Individuals with Disabilities Education Act specifying schools must determine each student's disability and educational needs using tools and procedures that are culturally responsive.

Norm group Large sample of students serving as a comparison group for scoring tests.

Norm-referenced grading In determining grades, assessing students' achievement in relation to one another.

Norm-referenced testing Testing in which scores are compared with the average performance of others.

Normal distribution The most commonly occurring distribution, in which scores are distributed evenly around the mean.

Object permanence The understanding that objects have a separate, permanent existence.

Observational learning Learning by observation and imitation of others—vicarious learning.

Operant conditioning Learning in which voluntary behavior is strengthened or weakened by consequences or antecedents.

Operants Voluntary (and generally goal-directed) behaviors emitted by a person or an animal.

Operations Actions an individual carries out by thinking them through instead of literally performing the actions.

Organization Ongoing process of arranging information and experiences into mental systems or categories. Ordered and logical network of relations.

Overlapping Supervising several activities at once.

Overlearning Practicing a skill past the point of mastery.

Overregularize To apply a rule of syntax or grammar in situations when the rule does not apply, for example, saying, "The bike was braked."

Overt aggression A form of hostile aggression that involves physical attack.

Paraphrase rule Policy whereby listeners must accurately summarize what a speaker has said before being allowed to respond.

Parenting styles The ways of interacting with and disciplining children.

PARS A four-step reading strategy: *Preview* the material to identify main ideas; *Ask* questions related to the main idea; *Read* the chapter to find answers to your questions; *Summarize* the main ideas in your own words.

Part learning Breaking a list of items into shorter lists.

Participant observation A method for conducting descriptive research in which the researcher becomes a participant in the situation in order to better understand life in that group.

Participants/subjects People or animals studied.

Participation structures The formal and informal rules for how to take part in a given activity.

Pedagogical content knowledge (PCK) Teacher knowledge that combines mastery of *academic content* with knowing *how to teach* the content and how to match instruction to *student differences*.

Peer cultures Groups of children or adolescents with their own rules and norms, particularly about such things as dress, appearance, music, language, social values, and behavior.

Percentile rank Percentage of those in the norming sample who scored below an individual's score.

Perception Interpretation of sensory information.

Performance assessments Any form of assessment that requires students to carry out an activity or produce a product in order to demonstrate learning.

Performance goal A personal intention to seem competent or perform well in the eyes of others.

Personal development Changes in personality that take place as one grows.

Personal learning environment (PLE) Virtual platform that provides tools that support individualized learning in a variety of contexts and situations.

Personal learning network (PLN) Framework in which knowledge is constructed through online peer interactions.

Person-first reference Language that places the emphasis on the individual and not the disability by speaking of "an individual with a specific learning disability" or any other condition.

Perspective-taking ability Understanding that others have different feelings and experiences.

Phonological loop Part of working memory. A speech- and sound-related system for holding and rehearsing (refreshing) words and sounds in short-term memory for about 1.5 to 2 seconds.

Physical development Changes in body structure and function over time.

Physiological or emotional arousal Physical and psychological reactions causing a person to feel alert, attentive, wide awake, excited, or tense.

Plasticity The brain's tendency to remain somewhat adaptable or flexible.

Portfolio A collection of the student's work in an area, showing growth, self-reflection, and achievement.

Positive behavior supports (PBS) Interventions designed to replace problem behaviors with new actions that serve the same purpose for the student.

Positive correlation A relationship between two variables in which the two increase or decrease together. Example: calorie intake and weight gain.

Positive practice overcorrection Practicing correct responses immediately after errors.

Positive reinforcement Strengthening behavior by presenting a desired stimulus after the behavior.

Positron emission tomography (PET) A method of localizing and measuring brain activity using computer-assisted motion pictures of the brain.

Pragmatics The rules for when and how to use language to be an effective communicator in a particular culture.

Precorrection A tool for positive behavior support that involves identifying the context for a student's misbehavior, clearly specifying the alternative expected behavior, modifying the situation to make the problem behavior less likely, and then rehearsing the expected positive behaviors in the new context and providing powerful reinforcers.

Prejudice Prejudgment or irrational generalization about an entire category of people.

Premack principle Principle stating that a more preferred activity can serve as a reinforcer for a less preferred activity.

Preoperational The stage before a child masters logical mental operations.

Presentation punishment Decreasing the chances that a behavior will occur again by presenting an aversive stimulus following the behavior; also called *Type I punishment*.

Pretest Formative test for assessing students' knowledge, readiness, and abilities before instruction begins.

Priming Activating a concept in memory or the spread of activation from one concept to another.

Principle Established relationship between factors.

Private speech Children's self-talk, which guides their thinking and actions. Eventually, these verbalizations are internalized as silent inner speech.

Problem Any situation in which you are trying to reach some goal and must find a means to do so.

Problem solving Creating new solutions for problems.

Problem-based learning Students are confronted with a problem that launches their inquiry as they collaborate to find solutions and learn valuable information and skills in the process.

Procedural knowledge Knowledge that is demonstrated when we perform a task; "knowing how."

Procedural memory Long-term memory for how to do things.

Procedures/Routines Prescribed steps for an activity.

Production deficiency Students learn problem-solving strategies, but do not apply them when they could or should.

Productions The contents of procedural memory; rules about what actions to take, given certain conditions.

Propositional network Set of interconnected concepts and relationships in which long-term knowledge is held.

Prototype A best example or best representative of a category.

Psychomotor domain Physical ability and coordination objectives.

Psychosocial Describing the relationship of the individual's emotional needs to the social environment.

Puberty The physiological changes during adolescence that lead to the ability to reproduce.

Punishment Process that weakens or suppresses behavior.

Pygmalion effect Exceptional progress by a student as a result of high teacher expectations for that student; named for the mythological king Pygmalion, who made a statue and then caused it to be brought to life.

Qualitative research Exploratory research that attempts to understand the meaning of events to the participants involved using such methods as case studies, interviews, ethnography, participant observation, and other approaches that focus on a few people in depth.

Quality Talk An approach to classroom discussions designed to increase students' high-level comprehension by encouraging students to think and talk about, around, and with the text.

Quantitative research Research that studies many participants in a more formal and controlled way using objective measures such as experimentation, statistical analyses, tests, and structured observations.

Quasi-experimental studies Studies that fit most of the criteria for true experiments, with the important exception that the participants are not assigned to groups at random. Instead, existing groups such as classes or schools participate in the experiments.

Race A socially constructed category based on appearances and ancestry.

Racial and ethnic pride A positive self-concept about your racial or ethnic heritage.

Radical constructivism Knowledge is assumed to be the individual's construction; it cannot be judged right or wrong.

Random Without any definite pattern; following no rule.

Range Distance between the highest and the lowest scores in a group.

Ratio schedule Reinforcement based on the number of responses between reinforcers.

Receptive vocabulary The words a person can understand in spoken or written language.

Reciprocal questioning Students work in pairs or triads to ask and answer questions about lesson material.

Reconstruction Re-creating information by using memories, expectations, logic, and existing knowledge.

Reflective Thoughtful and inventive. Reflective teachers think back over situations to analyze what they did and why, and to consider how they might improve learning for their students.

Refugees A special group of immigrants who also relocate voluntarily but who are fleeing their home country because living there is not safe for them.

Reinforcement Use of consequences to strengthen behavior.

Reinforcer Any event that follows a behavior and increases the chances that the behavior will occur again.

Relational aggression A form of hostile aggression that involves verbal attacks and other actions meant to harm social relationships.

Reliability Consistency of test results.

Removal punishment Decreasing the chances that a behavior will occur again by removing a pleasant stimulus following the behavior; also called *Type II punishment*.

Representativeness heuristic Judging the likelihood of an event based on how well the events match your prototypes—what you think is representative of the category.

Reprimands Criticisms for misbehavior; rebukes.

Resilience The ability to adapt successfully in spite of difficult circumstances and threats to development.

Resistance culture Group values and beliefs about refusing to adopt the behaviors and attitudes of the majority culture.

Respondents Responses (generally automatic or involuntary) elicited by specific stimuli.

Response Observable reaction to a stimulus.

Response cost Punishment by loss of reinforcers.

Response set Rigidity; the tendency to respond in the most familiar way.

Response to intervention (RtI) A process to make sure students get appropriate research-based instruction and support as soon as possible and that teachers are systematic in documenting the interventions they have tried with these students so they can use this information in planning instruction.

Restorative justice An alternative to punishment that focuses on building, nurturing, and repairing relationships while giving a voice to victims, offenders, and the community.

Restructuring Conceiving of a problem in a new or different way.

Retrieval Process of searching for and finding information in long-term memory.

Retrieval practice/Testing effect Practicing by retrieving information from memory instead of rereading or restudying—more effective because retrieval seems to help memories consolidate in the brain and strengthens the neural pathways so the knowledge is easier to find later.

Reversibility A characteristic of Piagetian logical operations—the ability to think through a series of steps and then mentally reverse the steps and return to the starting point; also called reversible thinking.

Reversible thinking Thinking backward, from the end to the beginning.

Ripple effect "Contagious" spreading of behaviors through imitation.

Rote memorization Remembering information by repetition without necessarily understanding the meaning of the information.

Rules Statements specifying expected and forbidden behaviors; dos and don'ts.

Scaffolding The practice of providing students with support for meaning making and independent thinking.

Schema-driven problem solving Recognizing a problem as a "disguised" version of an old problem for which one already has a solution.

Schemas (singular, *schema*) In cognitive theory, basic structures for organizing information; concepts.

Schemes Mental systems or categories of perception and experience.

Scoring rubrics Rules that are used to determine the quality of a student's performance.

Script Schema, or expected plan, for the sequence of steps in a common event such as buying groceries or ordering pizza.

Scripted cooperation Learning strategy in which two students take turns summarizing material and critiquing the summaries.

Section 504 A part of civil rights law that prevents discrimination against people with disabilities in programs that receive federal funds, such as public schools.

Selected-response testing A form of testing in which students choose the correct response from a set of possible responses provided by the teacher or the test developer instead of creating their own response. Multiple-choice and true-false tests are common examples of selected-response testing.

Self-actualization Fulfilling one's potential.

Self-concept Individuals' knowledge and beliefs about themselves—their ideas, feelings, attitudes, and expectations.

Self-efficacy A sense of being able to deal effectively with a particular task. Beliefs about your personal capabilities in a particular situation.

Self-esteem The value each of us places on our own characteristics, abilities, and behaviors.

Self-fulfilling prophecy A groundless expectation that is confirmed because it has been expected.

Self-handicapping Students' engagement in behavior that blocks their own success in order to avoid testing their true ability.

Self-instruction Talking oneself through the steps of a task.

Self-management Management of your own behavior and acceptance of responsibility for your own actions. Also the use of behavioral learning principles to change your own behavior.

Self-regulated learning A view of learning that emphasizes the role of both skill and will when analyzing learning tasks, setting goals, applying skills, maintaining motivation, monitoring progress, and making adjustments about how learning is carried out.

Self-regulation Process of activating and sustaining thoughts, behaviors, and emotions in order to reach goals.

Self-regulatory knowledge Knowing how to manage your learning, or knowing how and when to use your declarative and procedural knowledge.

Self-reinforcement Controlling (selecting and administering) your own reinforcers.

Semantic memory Memory for meaning.

Semilingual A lack of proficiency in any language; speaking one or more languages inadequately.

Semiotic function The ability to use symbols—language, pictures, signs, or gestures—to represent actions or objects mentally.

Sensitive periods Times when a person is especially ready to learn certain things or is responsive to certain experiences.

Sensorimotor Involving the senses and motor activity.

Sensory memory System that holds sensory information very briefly.

Serial-position effect The tendency to remember the beginning and the end, but not the middle of a list.

Seriation Arranging objects in sequential order according to one aspect, such as size, weight, or volume.

Sexual orientation A multidimensional construct that refers to people's sexual identity, sexual attraction, and/or sexual behavior.

Shaping Reinforcing each small step of progress toward a desired goal or behavior.

Shared regulation Students and teachers working together to regulate each other through reminders, prompts, and other guidance.

Sheltered instruction Approach to teaching that improves English language skills while teaching content to students who are English learners by putting the words and concepts of the content into context to make the content more understandable.

Sheltered Instruction Observation Protocol (SIOP®) An observational system to ensure that each element of sheltered instruction is present for a teacher.

Short-term memory Component of memory system that holds information for about 20 seconds.

Situated learning The idea that skills and knowledge are tied to the situation in which they were learned and that they are difficult to apply in new settings.

Social and emotional learning (SEL) The process of integrating thinking, emotion, and behavior into teaching and learning so that adults and children develop skills to be aware of themselves and others, learn to manage their own and others' emotions and behavior, make responsible decisions, and build positive relationships.

Social cognitive theory Theory of learning and motivation that adds to social learning theory a consideration of cognitive factors such as beliefs, self-perceptions, and expectations.

Social conventions Agreed-upon rules and ways of doing things in a particular situation.

Social development Changes over time in the ways we relate to others.

Social goals A wide variety of needs and motives to be connected to others or part of a group.

Social isolation Removal of a disruptive student for 5 to 10 minutes.

Social learning theory Theory that emphasizes learning through observation of others.

Social negotiation Aspect of learning process that relies on collaboration with others and respect for different perspectives.

Social persuasion Evaluative messages that students receive from people around them that convey information about their capabilities.

Sociocultural theory Emphasizes role in development of cooperative dialogues between children and more knowledgeable members of society. Children learn the culture of their community (ways of thinking and behaving) through these interactions.

Socioeconomic status (SES) Relative standing in a society based on income, power, background, and prestige.

Sociolinguistics The study of the formal and informal rules for how, when, about what, to whom, and how long to speak in conversations within cultural groups.

Source monitoring Deciding if a memory is real and accurate by remembering where you encountered particular information—your own experience, a dream, TV, or someone else's experience.

Spasticity Overly tight or tense muscles, characteristic of some forms of cerebral palsy.

Specific learning disability Problem with acquisition and use of language; may show up as difficulty with reading, writing, reasoning, or math.

Speech impairment Inability to produce sounds effectively for speaking.

Spermarche The first sperm ejaculation for boys.

Spiral curriculum Bruner's design for teaching that introduces the fundamental structure of all subjects early in the school years and then revisits the subjects in more and more complex forms over time.

Spreading activation Retrieval of pieces of information based on their relatedness to one another. Remembering one bit of information activates (stimulates) recall of associated information.

Standard deviation Measure of how widely scores vary from the mean.

Standard error of measurement Hypothetical estimate of variation in scores if testing were repeated.

Standard scores Scores based on the standard deviation.

Standardized tests Tests given, usually nationwide, under uniform conditions and scored according to uniform procedures.

Stanine scores Whole-number scores from 1 to 9, each representing a wide range of raw scores.

Statistically significant Not likely to be a chance occurrence.

Stem The question part of a multiple-choice item.

Stereotype A widely held, often oversimplified schema that organizes knowledge or perceptions about a category.

Stereotype threat The emotional and cognitive burdens that can result from heightened awareness that your performance in an academic situation might confirm a stereotype that others hold about you.

Stimulus Event that activates behavior.

Stimulus control Capacity for the presence or absence of antecedents to cause behaviors.

Story grammar Typical structure or organization for a category of stories.

Structured English immersion (SEI) An environment that teaches English rapidly by maximizing instruction in English and using English at a level appropriate to the abilities of the students in the class who are English learners.

Successive approximations Reinforcing small steps to reach a goal; the small component steps that make up a complex behavior.

Summative assessment Testing that follows instruction and assesses achievement.

Sustaining expectation effect Student performance is maintained at a certain level because teachers don't recognize improvements.

Synapses The tiny space between neurons—chemical messages are sent across these gaps.

Synaptic plasticity See *plasticity*.

Syntax The order of words in phrases or sentences.

***T* score** Standard score with a mean of 50 and a standard deviation of 10.

Task analysis System for breaking down a task hierarchically into basic skills and subskills.

Taxonomy Classification system.

Teachers' sense of efficacy Teachers' beliefs about how capable they are of reaching even the most difficult students and helping them learn.

Theory Integrated statement of principles that attempts to explain a phenomenon and make predictions.

Theory of mind An understanding that other people are people too, with their own minds, thoughts, feelings, beliefs, desires, and perceptions.

Theory of multiple intelligences (MI) In Gardner's theory of multiple intelligences, an individual has eight separate abilities: logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist.

Theory-based An explanation for concept formation that suggests our classifications are based on ideas about the world that we create to make sense of things.

Time on task Time spent actively engaged in the learning task at hand. Also referred to as *engaged time.*

Time out Technically, the removal of all reinforcement. In practice, isolation of a student from the rest of the class for a brief time.

Token reinforcement system System in which tokens earned for academic work and positive classroom behavior can be exchanged for some desired reward.

Tonic-clonic seizure: A generalized seizure that includes uncontrolled movements, twitching, or spasms.

Top-down processing Making sense of information by using context and what we already know about the situation; sometimes called *conceptually driven perception.*

Transfer Influence of previously learned material on new material; the productive (not reproductive) uses of cognitive tools and motivations.

Transition programming Gradual preparation of students with special needs to move from high school into further education or training, employment, or community involvement.

Trauma-informed educators Teachers who recognize the students' history of trauma; understand how trauma can affect the students' emotions, behavior, and learning; and design learning environments that address the needs of the students while avoiding retraumatizing them.

Triadic reciprocal causality An explanation of human functioning as the interaction between personal, behavioral, and environmental influences.

Triarchic theory of successful intelligence A three-part description of the mental abilities (thinking processes, coping with new experiences, and adapting to context) that lead to more or less intelligent behavior.

True score The score the student would get if the measurement were completely accurate and error-free.

Unconditioned response (UR) Naturally occurring emotional or physiological response.

Unconditioned stimulus (US) Stimulus that automatically produces an emotional or physiological response.

Understanding by Design (UbD) A system of lesson and unit planning that starts with key objectives for understandings and then moves backward to design assessments and learning activities.

Universal design Considering the needs of all users in the design of new tools, learning programs, or websites.

Universal design for learning (UDL) Strategies and structures to make learning accessible to as many students as possible in inclusive settings.

Utility value The usefulness of a task for meeting your goals.

Validity Degree to which a test measures what it is intended to measure. To be valid, the decisions and inferences based on the test must be supported by evidence.

Value An individual's belief about the extent to which a task or assignment is generally useful, enjoyable, or otherwise important.

Value-added modeling (VAM) Approaches that use statistical analyses to indicate the average test score gain for students, adjusted for their student characteristics such as prior level of achievement.

Variability Degree of difference or deviation from mean.

Verbalization Putting your problem-solving plan and its logic into words.

Vicarious experiences Accomplishments that are modeled by someone else.

Vicarious reinforcement Increasing the chances that we will repeat a behavior by observing another person being reinforced for that behavior.

Virtual learning environments (VLEs) Technology-based platforms that allow learning in a variety of ways.

Visuo-spatial sketchpad Part of working memory. A holding system for visual, tactile, and spatial information.

Voicing problems Inappropriate pitch, quality, loudness, or intonation.

Volition Willpower; an internally driven, intentional decision to reach valued goals by applying self-regulated learning.

Warm demanders Teachers who are especially effective with Black students; they show both high expectations and great caring for their students.

Webb's Depth of Knowledge (DOK) A taxonomy system similar to Bloom's cognitive domain in that it moves from lower- to higher-level thinking; often is used in planning curriculum and assessments around the Common Core State Standards.

What Works Clearinghouse A service of the U.S. Institute of Education Sciences that reviews the existing research on different programs, products, practices, and policies in education in order to provide educators with the information they need to make evidence-based decisions.

Within-class ability grouping System of grouping in which students in a class are divided into two or three groups based on ability in an attempt to accommodate student differences.

Withitness According to Kounin, awareness of everything happening in a classroom.

Work-avoidant learners Students who don't want to learn or to look smart, but just want to avoid work.

Working memory The brain system that provides temporary holding and processing of information to accomplish complex cognitive tasks such as language comprehension, learning, and reasoning; the information that you are focusing on at a given moment.

Working-backward strategy Heuristic in which you start with the goal and move backward to solve the problem.

***z* score** Standard score indicating the number of standard deviations above or below the mean that a particular raw score falls.

Zero reject A basic principle of the Individuals with Disabilities Education Act specifying that no student with a disability, no matter what kind or how severe, can be denied a free public education.

Zone of proximal development (ZPD) Developmental phase at which a child can master a task if given appropriate help and support from a more capable person.

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