When I first set out to write *Educational Psychology: Theory and Practice*, I had a very clear purpose in mind. I wanted to give tomorrow’s teachers the intellectual grounding and practical strategies they will need to be effective instructors. Most of the textbooks published then, I felt, fell into one of two categories: stuffy or lightweight. The stuffy books were full of research but were ponderously written, losing the flavor of the classroom and containing few guides to practice. The lightweight texts were breezy and easy to read but lacked the dilemmas and intellectual issues brought out by research. They contained suggestions of the “Try this!” variety, without considering evidence about the effectiveness of those strategies.

My objective was to write a text that:

- Presents information that is as complete and up to date as the most research-focused texts but is also readable, practical, and filled with examples and illustrations of key ideas.
- Includes suggestions for practice based directly on classroom research (tempered by common sense) so I can have confidence that when you try what I suggest, it will be likely to work.
- Helps you transfer what you learn in educational psychology to your own teaching by making explicit the connection between theory and practice through numerous realistic examples. Even though I have been doing educational research since the mid-1970s, I find that I never really understand theories or concepts in education until someone gives me a compelling classroom example; and I believe that most of my colleagues (and certainly teacher education students) feel the same way. As a result, the word example or similar words appear hundreds of times in this text.
- Appeals to readers; therefore, I have tried to write in such a way that you will almost hear students’ voices and smell the lunch cooking in the school cafeteria as you read.

These have been my objectives for the book from the first edition to this, the eleventh edition. With every edition, I have made changes throughout the text, adding new examples, refining language, and deleting dated or unessential material. I am meticulous about keeping the text up to date, so this edition has more than 2,000 reference citations, 75 percent of which are from 2000 or later. The eleventh edition is updated with more than 656 new references. Although some readers may not care much about citations, I want you and your professors to know what research supports the statements I’ve made and where to find additional information.

The field of educational psychology and the practice of education have changed a great deal in recent years, and I have tried to reflect these changes in this edition. Several years ago, direct instruction and related teacher effectiveness research were dominant in educational psychology. Then constructivist methods, portfolio and performance assessments, and other humanistic strategies returned. Next, the emphasis was on accountability, which requires teachers more than ever to plan outcomes and teach purposefully, qualities that I emphasize in this edition as intentional teaching. Today, the Common Core State Standards are increasing accountability pressures but also inviting more thoughtful teaching and learning, including writing, cooperative learning, and experimentation. In the earliest editions of this text, I said that we shouldn’t entirely discard discovery learning and humanistic methods despite the popularity, then, of direct instruction. In the next editions, I made just the opposite plea: that we shouldn’t completely discard direct instruction despite the popularity of active, student-centered teaching and constructivist methods of instruction. I continue to advocate a balanced approach to instruction. No matter what their philosophical orientations, experienced teachers know that they must be proficient in a wide range of methods and must use them thoughtfully.

The eleventh edition presents new research and practical applications of many topics. Throughout, this edition reflects the “cognitive revolution” that has transformed educational psychology and teaching. No one can deny that teachers matter or that teachers’ behaviors have a profound impact on student achievement. To make that impact positive, teachers must have both a deep understanding of the powerful principles of psychology as they apply to education and a clear sense of how these principles can be applied. The intentional teacher is one who constantly reflects on his or her practices and makes instructional decisions based on a clear conception of how these practices affect students. Effective teaching is neither a bag of tricks nor a set of abstract principles;
rather, it is intelligent application of well-understood principles to address practical needs. I hope this edition will help you develop the intellectual and practical skills you need to do the most important job in the world—teaching.

NEW AND EXPANDED COVERAGE

Among the many topics that receive new or expanded coverage in this edition are:

• Common Core State Standards
• The future of teaching (Chapter 1)
• Action research (Chapter 1)
• Nature vs. nurture (Chapter 2)
• Vygotsky’s theories (Chapter 2)
• Bronfenbrenner’s theories (Chapter 2)
• Enhancing socioemotional development (Chapter 3)
• Parent involvement (Chapter 4)
• Emerging research in information processing and neuroscience (Chapter 6)
• The latest research on peer interaction and cooperative learning (Chapter 8)
• A completely rewritten and expanded section on technology applications (Chapter 9)
• New research on tutoring and small group remediation for struggling readers (Chapter 9)
• More on differentiated instruction (Chapter 9)
• Research on mindset (Chapter 10)
• More on intrinsic incentives (Chapter 10)
• More on learning vs. performance goals (Chapter 10)
• New sections on bullying and classroom management (Chapter 11)
• Expanded coverage of Response to Intervention (Chapter 12)
• Expanded coverage of autism spectrum disorder (Chapter 12)
• More on performance assessments (Chapter 13)
• Detailed coverage of the Common Core State Standards (Chapter 14)
• Additional coverage of value-added assessments (Chapter 14)
• More on data-informed teaching (Chapter 14)
• New information on testing accommodations for English learners (Chapter 14)
• More on computerized assessment (Chapter 14)
HOW THIS BOOK IS ORGANIZED

The chapters in this book address three principal themes: students, teaching, and learning. Each chapter discusses important theories and includes many examples of how these theories apply to classroom teaching.

This book emphasizes the intelligent use of theory and research to improve instruction. The chapters on teaching occupy about one-third of the total pages in the book, and the other chapters all relate to the meaning of theories and research practice. Whenever possible, the guides in this book present specific programs and strategies that have been evaluated and found to be effective, not just suggestions of things to try.

FEATURES

Licensure

This text has always had a very strong focus on helping its readers understand how educational psychology is used in teacher licensure tests like Praxis and the National Evaluation Series. And this edition has multiple tools to help you apply your learning to licensure and certification. In each chapter you can both identify and practice the appropriate knowledge and skills you have attained.

• To help you assess your own learning and prepare for licensure exams, Certification Pointers identify content likely to be on certification tests.

• A special marginal icon identifies content that correlates to InTASC standards. These correspond closely to Praxis, and many state assessments are patterned on Praxis. For those of you using the Pearson eText, when you click on the InTASC, you can read the appropriate standard without having to leave the page.

• In addition, Self-Assessment: Practicing for Licensure features at the end of each chapter are designed to resemble the types of questions and content typically encountered on state certification tests. Pearson eText users can answer these questions and receive immediate feedback.

SELF-ASSESSMENT: PRACTICING FOR LICENSURE

Directions: The chapter-opening vignettes identify indicators that are often assessed in state licensure exams. Refer to the chapter-opening vignette and then respond to the following questions.

1. In the first paragraph, Ellen Mathe does not understand why his students are uncooperative and demotivated in their writing. According to educational psychology research, which of the following teacher characteristics is Ellen most likely lacking?
   a. Classroom management skill
   b. Content knowledge
   c. Intentionality
   d. Common sense

2. Leah Washington talks with Ellen Mathe about getting students to write interesting compositions. Which of the following statements best explains Mathe’s approach to teaching writing?
   a. Select teaching methods, learning activities, and instructional materials that are appropriate and motivating for students.
   b. Have students of similar abilities work together so the teacher can adapt instruction to meet the needs of each group.
   c. When working on writing activities, consider the teacher to be the instruction center.
   d. Individualization is the first goal of instruction; direct instruction is the second goal.

3. According to research on expertise development, what characteristic separates novice teachers from expert teachers.
   a. Novice teachers tend to rely on their pedagogical skills because their content knowledge is less complex than that of experts.
   b. Expert teachers do more short-term memory processing than novice because their thinking is more complex.

4. According to research on expertise development, what characteristic separates novice teachers from expert teachers?
   a. Novice teachers tend to rely on their pedagogical skills because their content knowledge is less complex than that of experts.
   b. Expert teachers do more short-term memory processing than novice because their thinking is more complex.

5. Leah Washington discusses many of her teaching strategies with Ellen Mathe. One can easily think of three obvious ideas to improve student learning. According to educational psychology research, which of the following is an obvious idea except one. Which one is obvious thinking is more complex.
   a. Encourage children to write for the purpose of thinking through their ideas before they write for publishing.
   b. Have students use their knowledge about print that are significant and draw attention to features in reading materials.
   c. Allow students to make instructional decisions based on their interests and needs.
   d. Allows students to make instructional decisions based on their interests and needs.

Finally, there is an appendix that maps the entire Praxis II: Principles of Learning and Teaching test to the book’s content.

Embedded Video Examples and Explanations

In the Pearson etext, you will note that instead of photographs there are videos. The use of videos instead of photographs provides deeper and more complete examples.
In line with the emphasis on reflective, intentional practice, I’ve added a feature that is intended to bring a bit of myself from behind the curtain that usually divides author and readers. I’ve made available live interviews, called Personal Reflections, in which I reflect on my own experiences as a teacher, researcher, and parent to illuminate various aspects of the text. In these video podcasts, I offer examples and further explanations where I think I might be able to help you better understand a concept or an application. Readers of the eText can simply click on these videos to watch them without leaving their book.

The Intentional Teacher

One attribute seems to be a characteristic of all outstanding teachers: intentionality, or the ability to do things for a reason, purposefully. Intentional teachers constantly think about the outcomes they want for their students and how each decision they make moves students toward those outcomes. A key feature in each chapter, The Intentional Teacher is designed to help you develop and apply a set of strategies to carry out your intentionality.

The Intentional Teacher features will help you combine your increasing knowledge of principles of educational psychology, your growing experience with learners, and your creativity to make intentional instructional decisions that will help students become enthusiastic, effective learners. For those using the Pearson eText, you will be able to actually take the strategies described in each Intentional Teacher feature and observe and analyze their use in real classrooms. After answering a series of questions, you will be given feedback that allows you to compare your analysis with an expert’s analysis.

Using Your Experience

Each chapter of the text opens with a vignette depicting a real-life situation that teachers encounter. Throughout the chapter narrative, I refer to the issues raised in the vignette. In addition, you have the opportunity to respond to the vignette in several related features, such as the Using Your Experience sections that follow each vignette. Each of these sections provides critical and creative thinking questions and cooperative learning activities that allow you to work with the issues brought up in the vignette, activate your prior knowledge, and begin thinking about the ideas the chapter will explore.

Common Core and 21st Century Learning

Throughout this book, a substantially revised feature presents information on 21st century learning and Common Core State Standards that relates to the topic of the chapter. Beyond this, 21st century learning skills and Common Core are discussed within the main parts of the text, as appropriate.

Educational policies and practices usually lag behind changes in society and the economy. The emphasis on 21st century learning is intended to help educators think more deeply about how each of the decisions they make about curriculum, teaching methods, use of technology, assessments, and so on contributes to helping students succeed not only by today’s standards, but also in tomorrow’s world.

Cartoons

Throughout the text is a series of cartoons created just for this book by my colleague, James Bravo, to illustrate key concepts in educational psychology. These are intended to be humorous and also to make you reflect.

Theory into Practice

The Theory into Practice sections in each chapter help you acquire and develop the tools you need to be an effective teacher. These sections present specific strategies to apply in your classroom. New Theory into Practice sections have been added throughout this edition.
INSTRUCTOR RESOURCES

• The Instructor’s Resource Manual contains chapter overviews, suggested readings, answers to the textbook Self-Assessment features, and handout masters. The Instructor's Manual is available for download from the Instructor Resource Center at www.pearsonhighered.com/irc.

• The PowerPoint™ Presentation highlights key concepts and summarizes text content. The PowerPoint™ Presentation is available for download from the Instructor Resource Center at www.pearsonhighered.com/irc.

• The Online Test Bank. The Test Bank that accompanies this text contains both multiple-choice and essay questions. There are also higher- and lower-level questions covering all of the content in the text.

• TestGen. Test Gen is a powerful test generator available exclusively from Pearson Education publishers. You install TestGen on your personal computer (Windows or Macintosh) and create your own tests for classroom testing and for other specialized delivery options, such as over a local area network or on the web. A test bank, which is also called a Test Item File (TIF), typically contains a large set of test items, organized by chapter and ready for your use in creating a test, based on the associated textbook material. Assessments—including equations, graphs, and scientific notation—may be created for both print or testing online. The tests can be downloaded in the following formats:
  • TestGen Testbank file – PC
  • TestGen Testbank file – MAC
  • TestGen Testbank – Blackboard 9 TIF
  • TestGen Testbank – Blackboard CE/Vista (WebCT) TIF
  • Angel Test Bank (zip)

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CHAPTER ONE
Educational Psychology: A Foundation for Teaching

CHAPTER OUTLINE
What Makes a Good Teacher?
   Knowing the Subject Matters (But So Does Teaching Skill)
   Mastering Teaching Skills
   Can Good Teaching Be Taught?
   The Intentional Teacher
   21st Century Skills
   Common Core State Standards
What Is the Role of Research in Educational Psychology?
   The Goal of Research in Educational Psychology
   The Value of Research in Educational Psychology to You the Teacher
   Teaching as Decision Making
   Research + Common Sense = Effective Teaching
   Research on Effective Programs
   Impact of Research on Educational Practice

LEARNING OUTCOMES
At the end of this chapter, you should be able to:
   • Identify attributes of effective teachers
   • Describe the role of educational research in informing classroom practice
   • Describe the research methods used in educational psychology and the rationale for each
   • Discuss how you can become an intentional teacher
Ellen Mathis, a new teacher, is trying to teach creative writing to her third-grade class, but things are just not going the way she’d hoped. Her students are not producing much, and what they do write is not very imaginative and full of errors. For example, she recently assigned a composition on “My Summer Vacation,” and all of her students wrote was “On my summer vacation I got a dog and we went swimming and I got stung by a bee.”

Ellen wonders whether her students are just not ready for writing and need several months of work on such skills as capitalization, punctuation, and usage before she tries another writing assignment. However, one day Ellen notices some compositions in the hall outside of Leah Washington’s class. Leah’s third-graders are just like Ellen’s, but their compositions are fabulous. The students wrote pages of interesting material on an astonishing array of topics. At the end of the day, Ellen catches Leah in the hall. “How do you get your kids to write such great compositions?” she asks.

Leah explains how she first got her children writing on topics they cared about and then gradually introduced “mini-lessons” to help them become better authors. She had the students work in small groups and help one another plan compositions. Then the students critiqued and helped edit one another’s drafts, before finally “publishing” final versions. “I’ll tell you what,” Leah offers. “I’ll schedule my next writing class during your planning period. Come see what we’re doing.”

Ellen agrees. When the time comes, she walks into Leah’s class and is overwhelmed by what she sees. Children are writing everywhere: on the floor, in groups, at tables. Many are talking with partners. Leah is conferencing with individual children. Ellen looks over the children’s shoulders and sees one student writing about her pets, another writing a gory story about ninjas, and another writing about a dream. Marta Delgado, a Hispanic student, is writing a funny story about her second-grade teacher’s attempts to speak Spanish. One student is even writing a very good story about her summer vacation!

After school, Ellen meets with Leah, bursting with questions. “How did you get students to do all that writing? How can you manage all that noise and activity? How did you learn to do this?”

“I did go to a series of workshops on teaching writing,” admits Leah. “But if you think about it, everything I’m doing is basic educational psychology.”

Ellen is amazed. “Educational psychology? I took that course in college. I got an ‘A’ in it! But I don’t see what it has to do with your writing program.”

“Well, let’s see,” said Leah. “To begin with, I’m using a lot of motivational strategies I learned in ed psych. For instance, when I started my writing instruction this year, I read students some funny and intriguing stories written by other classes, to arouse their curiosity. I got them motivated by letting them write about whatever they wanted, and also by having ‘writing celebrations’ in which students read their finished compositions to the class for applause and comments. My educational psychology professor was always talking about adapting to students’ needs. I do this by conferencing with students and helping them with the specific problems they’re having. I first learned about cooperative learning in ed psych, and later on I took some workshops on it. I use cooperative learning groups to let students give each other immediate feedback on their writing, to let them model effective writing for each other, and to get them to encourage each other to write. The groups also solve a lot of my management problems by keeping each other on task and dealing with many classroom routines. I remember that we learned about evaluation in ed psych. I use a flexible form of evaluation. Everybody eventually gets an A, but only when their composition meets a high standard, which may take many drafts.”

Ellen is impressed. She and Leah arrange to visit each other’s classes a few more times to exchange ideas and observations, and in time, Ellen’s writers are almost as good as Leah’s. But what most impresses her is the idea that educational psychology can be useful in her day-to-day teaching. (continued)
What is educational psychology? Educational psychology is the study of learners, learning, and teaching. However, for students who are or expect to be teachers, educational psychology is something more. It is the accumulated knowledge, wisdom, and seat-of-the-pants theory that every teacher should possess to intelligently solve the daily problems of teaching. Educational psychology cannot tell you as a teacher what to do, but it can give you the principles to use in making a good decision and a language to discuss your experiences and thinking (Anderman, 2011). Consider the case of Ellen Mathis and Leah Washington. Nothing in this or any other educational psychology text will tell you exactly how to teach creative writing to a particular group of third-graders. However, Leah uses concepts of educational psychology to consider how she will teach writing and then to interpret and solve problems she runs into, as well as to explain to Ellen what she is doing. Educational psychologists carry out research on the nature of students and effective methods of teaching to understand principles of learning and give educators the information they need to think critically about their craft and make teaching decisions that will work for their students.

What makes a good teacher? Is it warmth, humor, and the ability to care about people? Is it planning, hard work, and self-discipline? What about leadership, enthusiasm, a contagious love of learning, and speaking ability? Most people would agree that all of these qualities are needed to make a good teacher, and they would certainly be correct. But these qualities are not enough.

Knowing the Subject Matters (But So Does Teaching Skill)

There is an old joke that goes like this:

Question: What do you need to know to be able to teach a horse?

Answer: More than the horse!

This joke makes the obvious point that the first thing a teacher must have is some knowledge or skills that the learner does not have; you must know the subject matter you plan to teach. But if you think about teaching horses (or children), you will soon realize that although subject matter knowledge is necessary, it is not enough. A rancher may have a good idea of how a horse is supposed to act and what a horse is supposed to be able to do, but if he doesn’t have the skills to make an untrained, scared, and unfriendly animal into a good saddle horse, he’s going to end up with nothing but broken ribs and teeth marks for his trouble. Children are a lot smarter and a little more forgiving than horses, but teaching them has this in common with teaching horses: Knowledge of how to transmit information and skills is at least as important as knowledge of the information and skills themselves. We have all had teachers who were brilliant and thoroughly knowledgeable in their fields but who could not teach. Ellen Mathis may know as much as Leah Washington about what good writing should be, but she has a lot to learn about how to get third-graders to write well.

For effective teaching, subject matter knowledge is not a question of being a walking encyclopedia. Vast knowledge is readily available. However, effective teachers not only know their subjects but also can communicate their knowledge to students. The celebrated high school math
teacher Jaime Escalante taught the concept of positive and negative numbers to students in a Los Angeles barrio by explaining that when you dig a hole, you might call the pile of dirt \( +1 \), the hole \(-1\). What do you get when you put the dirt back in the hole? Zero. Escalante’s ability to relate the abstract concept of positive and negative numbers to everyday experience is one example of how the ability to communicate knowledge goes far beyond simply knowing the facts.

**Mastering Teaching Skills**

The link between what a teacher wants students to learn and students’ actual learning is called instruction, or pedagogy. Effective instruction is not a simple matter of one person with more knowledge transmitting that knowledge to another (Baumert et al., 2010; Gess-Neucombe, 2012). If telling were teaching, this book would be unnecessary. Rather, effective instruction demands the use of many strategies.

For example, suppose Paula Wilson wants to teach a lesson on statistics to a diverse class of fourth-graders. To do so, Paula must accomplish many related tasks. She must make sure that the class is orderly and that students know what behavior is expected of them. She must find out whether students have the prerequisite skills; for example, students need to be able to add and divide to find averages. If any do not, Paula must find a way to teach students those skills. She must engage students in activities that lead them toward an understanding of statistics, such as having students roll dice, play cards, or collect data from experiments; and she must use teaching strategies that help students remember what they have been taught. The lessons should also take into account the intellectual and social characteristics of students in the fourth grade and the intellectual, social, and cultural characteristics of these particular students. Paula must make sure that students are interested in the lesson and motivated to learn statistics. To see whether students are learning what is being taught, she may ask questions or use quizzes or have students demonstrate their understanding by setting up and interpreting experiments, and she must respond appropriately if these assessments show that students are having problems. After the series of lessons on statistics ends, Paula should review this topic from time to time to ensure that it is remembered.

These tasks—motivating students, managing the classroom, assessing prior knowledge, communicating ideas effectively, taking into account the characteristics of the learners, assessing learning outcomes, and reviewing information—must be attended to at all levels of education, in or out of school. They apply as much to the training of astronauts as to the teaching of reading. How these tasks are accomplished, however, differs widely according to the ages of the students, the objectives of instruction, and other factors.

What makes a good teacher is the ability to carry out all the tasks involved in effective instruction. Warmth, enthusiasm, and caring are essential (Cornelius-White, 2007; Eisner, 2006; Marzano, 2011), as are subject matter knowledge and understanding of how children learn (Baumert et al., 2010; Wiggins & McTighe, 2007). But it is the successful accomplishment of all the tasks of teaching that makes for instructional effectiveness.

**Can Good Teaching Be Taught?**

Some people think that good teachers are born that way. Outstanding teachers sometimes seem to have a magic, a charisma that mere mortals could never hope to achieve. Yet research has begun to identify the specific behaviors and skills that make a “magic” teacher (Borman & Kimball, 2005). An outstanding teacher does nothing that any other teacher cannot also do—it is just a question of knowing the principles of effective teaching and how to apply them. Take one small example: In a high school history class, two students in the back of the class are whispering to each other, and they are not discussing the Treaty of Paris! The teacher slowly walks toward them without looking, continuing his lesson as he walks. The students stop whispering and pay attention. If you didn’t know what to look for, you might miss this brief but critical interchange and believe that the teacher just has a way with students, a knack for keeping their attention. But the teacher is simply applying principles of classroom management that anyone could learn: Maintain momentum in the lesson, deal with behavior problems by using the mildest intervention that will work, and resolve minor problems before they become major ones. When Jaime Escalante gave the example of digging a hole to illustrate the concept of positive and negative numbers, he was also applying several important principles of educational psychology: Make abstract ideas concrete by
Can good teaching be taught? The answer is definitely yes (Ball & Forzani, 2010). Good teaching has to be observed and practiced, but there are principles of good teaching that teachers need to know, which can then be applied in the classroom. The major components of effective instruction are summarized in Figure 1.1.

**The Intentional Teacher**

There is no formula for good teaching, no seven steps to Teacher of the Year. Teaching involves planning and preparation, and then dozens of decisions every hour. Yet one attribute seems to be characteristic of outstanding teachers: **intentionality**. Intentionality means doing things for a reason, on purpose. Intentional teachers constantly think about the outcomes they want for their students and about how each decision they make moves children toward those outcomes (Fisher & Frey, 2011). Intentional teachers know that maximum learning does not happen by chance. Yes, children do learn in unplanned ways all the time, and many will learn from even the most chaotic lesson. But to really challenge students, to get their best efforts, to help them make conceptual leaps and organize and retain new knowledge, teachers need to be intentional: purposeful, thoughtful, and flexible, without ever losing sight of their goals for every child.

"If only I could get to my ed psych text . . ."
The idea that teachers should always do things for a reason seems obvious. Yet in practice, it is difficult to constantly make certain that all students are engaged in activities that lead to important learning outcomes. Teachers very frequently fall into strategies that they themselves would recognize, on reflection, as being time fillers rather than instructionally essential activities. For example, an otherwise outstanding third-grade teacher once assigned seatwork to one of her reading groups. The children were given two sheets of paper with words in squares. Their task was to cut out the squares on one sheet and then paste them onto synonyms on the other. When all the words were pasted correctly, lines on the pasted squares formed an outline of a cat, which the children were then to color. Once the children pasted a few squares, the puzzle became clear; so they could paste the remainder without paying any attention to the words themselves. For almost an hour of precious class time, these children happily cut, pasted, and colored—not high-priority skills for third-graders. The teacher would have said that the objective was for children to learn or practice synonyms, of course; but in fact the activity could not possibly have moved the children forward on that skill. Similarly, many teachers have one child laboriously work a problem on a whiteboard while the rest of the class has nothing important to do. Some secondary teachers spend most of the class period going over homework and classwork and end up doing very little teaching of new content. Again, these may be excellent teachers in other ways, but they sometimes lose sight of what they are trying to achieve and how they are going to achieve it.

Intentional teachers are constantly asking themselves what goals they and their students are trying to accomplish. Is each portion of their lesson appropriate to students’ background knowledge, skills, and needs? Is each activity or assignment clearly related to a valued outcome? Is each instructional minute used wisely and well? An intentional teacher trying to build students’ synonym skills might have them work in pairs to master a set of synonyms in preparation for individual quizzes. An intentional teacher might have all children work a given problem while one works at the board, so that all can compare answers and strategies together. An intentional teacher might quickly give homework answers for students to check themselves, ask for a show of hands for correct answers, and then review and reteach only those exercises missed by many students to save time for teaching of new content. An intentional teacher uses a wide variety of instructional methods, experiences, assignments, and materials to be sure that children are achieving all sorts of cognitive objectives, from knowledge to application to creativity, and that at the same time children are learning important affective objectives, such as love of learning, respect for others, and personal responsibility. An intentional teacher constantly reflects on his or her practices and outcomes (Fisher & Frey, 2011; Marzano, 2011).

Research finds that one of the most powerful predictors of a teacher’s impact on students is the belief that what he or she does makes a difference. This belief, called teacher efficacy (Henson, 2002; Woolfolk-Hoy, Hoy, & Davis, 2009), is at the heart of what it means to be an intentional teacher. Teachers who believe that success in school is almost entirely due to children’s inborn intelligence, home environment, or other factors that teachers cannot influence are unlikely to teach in the same way as those who believe that their own efforts are the key to children’s learning. An intentional teacher, one who has a strong belief in her or his efficacy, is more likely to put forth consistent effort, to persist in the face of obstacles, and to keep trying relentlessly until every student succeeds (Farr, 2010). Intentional teachers achieve a sense of efficacy by constantly assessing the results of their instruction; trying new strategies if their initial instruction doesn’t work; and continually seeking ideas from colleagues, books, online resources, magazines, workshops, and other sources to enrich and solidify their teaching skills (Corbett, Wilson, & Williams, 2005). Collective efficacy can have a particularly strong impact on student achievement (Woolfolk Hoy et al., 2009). Groups of teachers, such as the entire faculty of an elementary school or all teachers in a secondary academic department, can attain collective efficacy by working together to examine their practices and outcomes, seeking professional development, and helping each other succeed (see Borko, 2004; Sachs, 2000; York-Barr, Sommerness, & Hur, 2008). Countries that are particularly successful in helping all children succeed are ones that provide opportunities for teachers to work together and to take collective responsibility for their students (Sahlberg, 2012; Sawchuk, 2012; Stewart, 2010; Tucker, 2012).

The most important purpose of this book is to give you, tomorrow’s teacher, the intellectual grounding in research, theory, and practical wisdom you will need in order to become an intentional, effective teacher. To plan and carry out effective lessons, discussions, projects, and other learning experiences, teachers need to know a great deal. Besides knowing your subjects, you need to understand the developmental levels and needs of your students. You need to understand how
learning, memory, problem-solving skill, and creativity are acquired and how to promote their acquisition. You need to know how to set objectives, organize activities designed to help students attain those objectives, and assess students’ progress toward them. You need to know how to motivate children, how to use class time effectively, and how to respond to individual differences among students. Intentional teachers are continually experimenting with strategies to solve problems of instruction and then observing the results of their actions to see if they were effective (Duck, 2000). They pay attention to research on effective teaching and incorporate research findings in their daily teaching (Fleischman, 2006). Like Leah Washington in the vignette that opened this chapter, intentional teachers are constantly combining their knowledge of principles of educational psychology, their experience, and their creativity to make instructional decisions and help children become enthusiastic and effective learners.

This text highlights the ideas that are central to educational psychology and the related research. It also presents many examples of how these ideas apply in practice, emphasizing teaching practices, not only theory or suggestions, that have been evaluated and found to be effective. The text is designed to help you develop critical-thinking skills for teaching: a logical and systematic approach to the many dilemmas that are found in practice and research. No text can provide all the right answers for teaching, but this one tries to pose the right questions and to engage you by presenting realistic alternatives and the concepts and research behind them.

Many studies have looked at the differences between expert and novice teachers and between more and less effective teachers. One theme comes through these studies: Expert teachers are critical thinkers (Hogan, Rabinowitz, & Craven, 2003; Mosenthal, Lipson, Torncello, Russ, & Mekkelsen, 2004; Shulman, 2000). Intentional teachers are constantly upgrading and examining their own teaching practices, reading and attending conferences to learn new ideas, and using their own students’ responses to guide their instructional decisions. There’s an old saying to the effect that there are teachers with 20 years of experience and there are teachers with 1 year of experience 20 times. Teachers who get better each year are the ones who are open to new ideas and who look at their own teaching critically. Perhaps the most important goal of this book is to get you in the habit of using informed reflection to become one of tomorrow’s expert teachers.

The importance of intentional teaching and critical thinking becomes even clearer when you reflect on the changes that will be taking place in teaching over the next 10–20 years. By 2030, it is certain that the work of teachers will be utterly transformed (see Berry et al., 2011). During your teaching career, there will be dramatic changes in the role of technology, especially as access to the Internet becomes universal. New forms of schooling beyond the physical school, and forms of teaching blending technological and traditional teaching, are already here, and will be expanding. New models of teacher preparation and inservice will become commonplace (Cochran-Smith & Power, 2010; Rose, 2010). New forms of school governance, such as charter schools, will continue to grow. Teachers are being held more and more accountable for their students’ learning (Danielson, 2010; Darling-Hammond et al., 2012; David, 2010; Schmoker, 2012; Stumbo & McWalters, 2010). All of these changes mean that teachers in 2020 or 2030 will have to be flexible, resilient, and capable of using new approaches to new problems (Christenbury, 2010; Steele, 2010). For a long time, teachers could always fall back on their own experiences as students, and teach like their own teachers taught them. Those days are gone.

21st Century Skills

Back when I was growing up, the 21st century was expected to be totally different from the 20th. The Jetsons, for example, projected an image of flying cars, robots in every home, and all sorts of amazing technology. More serious futurists expected more or less the same. The reality has turned out to be a little more prosaic, but nevertheless, developments in technology and globalization have dramatically changed key aspects of our economy and society. In particular, economic security, for both individuals and for nations, depends more than ever on innovation, creativity, and design. The ability to work cooperatively with others, to see many solutions to problems, and to be flexible and responsive to rapid change are all becoming keys to success, as traditional “strong back” jobs disappear to be replaced by “strong mind” careers.

All of these changes have profound significance for education. They lead educators to put a strong value on skills, attitudes, and ways of working that more closely resemble new workforce conditions. It should go without saying that students need extensive experience with technology, but
that is not enough. They also need extensive experience working in groups, solving problems, and learning to read critically and think creatively (Beers, 2011; Marzano & Heflebower, 2012). Ironically, these kinds of experiences are at the core of the progressive philosophy of John Dewey and many others, which date back to the beginning of the 20th century (Rotherham & Willingham, 2009). What has changed is that these ideas are no longer optional, as they happen to correspond to today’s needs. Moreover, these skills are now needed for everyone, from the executive office to the shop floor.

Consistent with this line of reasoning, a Partnership for 21st Century Skills has been created to promote policies defining and supporting student outcomes that align with today’s needs (see P. Johnson, 2009; Partnership for 21st Century Skills, 2009). The Partnership has created a framework that organizes 21st century skills in four categories, synthesizing suggestions from dozens of stakeholder groups at all levels of education:

1. Core subjects and 21st century themes (such as language arts, mathematics, science, global awareness, and financial literacy) (see Cutshall, 2009; Hersh, 2009; Trefil & O’Brien-Trefil, 2009; Zhao, 2009)
2. Learning and innovation skills (such as creativity, critical thinking, and problem solving) (see Azzam, 2009; Graseck, 2009)
3. Information, media, and technology skills (see Barab, Gresalfi, & Arici, 2009; Ferriter, 2009a, b; Sprenger, 2009)
4. Life and career skills (such as initiative and self-direction) (see Gerdes & Ljung, 2009)

**Common Core State Standards**

For many years, each state in the United States has had its own standards, which are expectations of what each child should know and be able to do in a given subject at a given age. Each state has also had its own assessments of attainment of those standards, usually using multiple-choice tests, and its own criteria for passing. These multiple-choice tests have been criticized in their own right for assessing only the most basic of skills, and the diversity of standards and assessments has led to wild differences between states in passing rates on state tests.

All of this is about to change, and the changes will have a big impact on your life as a teacher. Almost all states have adopted Common Core standards, based in large part on the 21st century skills discussed earlier. As of this writing, there are two large consortia of states, each developing assessments aligned with the Common Core. These assessments will solve some of the problems of state-to-state variation, but more importantly to teachers, they are intended to move teachers and schools toward innovative approaches to teaching in line with the needs of colleges and the workplace in the 21st century. The standards will emphasize the following (see Kendall, 2011):

- Flexible, creative problem solving
- Ability to use technology
- Ability to participate in active discussions in one-to-one, small-group, and whole-class settings
- Focus on writing, speaking, and argumentation in groups
- Alignment of standards with college and career readiness
- Focus in reading on classic texts (Voltaire, Shakespeare, Frost, Poe) as well as new and multicultural texts
- Focus in math on problem solving in real-world contexts, mathematical reasoning, precision, and argumentation

The Common Core standards may or may not matter to your students’ learning (see Barton, 2010; Loveless, 2012; and Schmidt & Huang, 2012 for opposing views), but they will surely matter to teachers and administrators. In preparation for the Common Core assessments, states and districts are doing a lot of professional development (Silver, Dewing, & Perini, 2012) and publishers are changing textbooks and software to match Common Core standards. These changes are discussed in Chapter 14.

Throughout this book, a feature in most chapters presents information on Common Core standards and 21st century learning that relates to the topic of the chapter. Beyond this, the Common Core is discussed throughout the main parts of the text, as appropriate.
All too often, educational policies and practices lag behind changes in society and the economy. The emphasis on the Common Core and 21st century skills is intended to help you think more deeply about how each of the decisions you make about curriculum, teaching methods, use of technology, assessments, and so on contribute to helping students succeed not only by today’s standards, but also in tomorrow’s world.

ON THE WEB
For more on the Common Core, see ccsso.org and engageny.org. Also, most state departments of education now discuss Common Core on their websites.

WHAT IS THE ROLE OF RESEARCH IN EDUCATIONAL PSYCHOLOGY?

Teachers who are intentional, critical thinkers are likely to enter classrooms equipped with knowledge about research in educational psychology. Every year, educational psychologists discover or refine principles of teaching and learning that are useful for practicing teachers. Some of these principles are just common sense backed up with evidence, but others are more surprising. One problem educational psychologists face is that almost everyone has ideas on the subject of educational psychology. Most adults have spent many years in schools watching what teachers do. Add to that a certain amount of knowledge of human nature, and voila! Everyone is an amateur educational psychologist. For this reason, professional educational psychologists are often accused of studying the obvious (see Ball & Forzani, 2007).

However, as we have painfully learned, the obvious is not always true. For example, most people assume that if students are assigned to classes according to their ability, the resulting narrower range of abilities in a class will let the teacher adapt instruction to the specific needs of the students and thereby increase student achievement. This assumption turns out to be false. Many teachers believe that scolding students for misbehavior will improve conduct. Many students will indeed respond to a scolding by behaving better, but for others, scolding may be a reward for misbehavior that actually increases it. Some “obvious” truths even conflict with one another. For example, most people would agree that students learn better from a teacher’s instruction than by working alone. This belief supports teacher-centered direct instructional strategies, in which a teacher actively works with the class as a whole. However, most people would also agree that students often need instruction tailored to their individual needs. This belief, also correct, would demand that teachers divide time among individuals, or at least among groups of students with differing needs, which would result in some students working independently while others receive your attention. If schools could provide tutors for every student, there would be no conflict; direct instruction and individualization could coexist. In practice, however, classrooms typically have 20 to 30 students; as a result, more direct instruction (the first goal) almost always means less individualization (the second goal). Your task as an intentional teacher is to balance these competing goals according to the needs of particular students and situations.

The Goal of Research in Educational Psychology

The goal of research in educational psychology is to carefully examine “obvious” as well as less-than-obvious questions, using objective methods to test ideas about the factors that contribute to learning (Levin, O’Donnell, & Kratochwill, 2003; McComb & Scott-Little, 2003). The products of this research are principles, laws, and theories. A principle explains the relationship between factors, such as the effects of alternative grading systems on student motivation. Laws are simply principles that have been thoroughly tested and found to apply in a wide variety of situations. A theory is a set of related principles and laws that explains a broad aspect of learning, behavior,
or another area of interest. Without theories, the facts and principles that are discovered would be like disorganized specks on a canvas. Theories tie together these facts and principles to give us the big picture. However, the same facts and principles may be interpreted in different ways by different theorists. As in any science, progress in educational psychology is slow and uneven. A single study is rarely a breakthrough, but over time evidence accumulates on a subject and allows theorists to refine and extend their theories.

The Value of Research in Educational Psychology to You the Teacher

It is probably true that the most important knowledge teachers gain is learned on the job—in internships, while student teaching, or during their first years in the classroom. However, you as a teacher make hundreds of decisions every day, and each decision has a theory behind it, regardless of whether you are aware of it. The quality, accuracy, and usefulness of those theories are what ultimately determine your success. For example, one teacher may offer a prize to the student with the best attendance, on the theory that rewarding attendance will increase it. Another may reward the student whose attendance is most improved, on the theory that it is poor attenders who most need incentives to come to class. A third may not reward anyone for attendance but instead try to increase attendance by teaching more interesting lessons. Which teacher’s plan is most likely to succeed? This depends in large part on the ability of each teacher to understand the unique combination of factors that shape the character of her or his classroom and therefore to apply the most appropriate theory.

Teaching as Decision Making

The aim of research in educational psychology is to test the various theories that guide the actions of teachers and others involved in education. There are many common situations, such as the following example, in which a teacher might use educational psychology.

Mr. Harris teaches an eighth-grade social studies class. He has a problem with Tom, who frequently misbehaves. Today, Tom makes a paper airplane and flies it across the room when Mr. Harris turns his back, to the delight of the entire class.

What should Mr. Harris do?

As an intentional teacher, Mr. Harris considers a range of options for solving this problem, each of which comes from a theory about why Tom is misbehaving and what will motivate him to behave more appropriately.

**Action**
1. Reprimand Tom.
2. Ignore Tom.
3. Send Tom to the office.
4. Tell the class that it is everyone’s responsibility to maintain a good learning environment and that if any student misbehaves, 5 minutes will be subtracted from recess.
5. Explain to the class that Tom’s behavior is interfering with lessons that all students need to know and that his behavior goes against the rules the class set for itself at the beginning of the year.

**Theory**
1. A reprimand is a form of punishment. Tom will behave to avoid punishment.
2. Attention may be rewarding to Tom. Ignoring him would deprive him of this reward.
3. Being sent to the office is punishing. It also deprives Tom of the (apparent) support of his classmates.
4. Tom is misbehaving to get his classmates’ attention. If the whole class loses out when he misbehaves, the class will keep him in line.
5. The class holds standards of behavior that conflict with both Tom’s behavior in class and the class’s reaction to it. By reminding the class of its own needs (to learn the lesson) and its own rules set at the beginning of the year, the teacher might make Tom see that the class does not really support his behavior.

Bob Slavin tells a story about his participation in a study involving observing the behaviors of children with behavioral or emotional disorders. Why was his study ruined? What lesson can you learn from this example about using research to be an effective teacher?
Each of these actions is a common response to misbehavior. But which theory (and therefore which action) is correct?

The key might be in the fact that his classmates laugh when Tom misbehaves. This response is a clue that Tom is seeking their attention. If Mr. Harris scolds Tom, this might increase Tom’s status in the eyes of his peers and thus reward his behavior. Ignoring misbehavior might be a good idea if a student is acting up to get your attention, but in this case it is apparently the class’s attention that Tom is seeking. Sending Tom to the office does deprive him of his classmates’ attention and therefore may be effective. But what if Tom is looking for a way to get out of class to avoid work? What if he struts out to confront the powers that be, to the obvious approval of his classmates? Making the entire class responsible for each student’s behavior is likely to deprive Tom of his classmates’ support and to improve his behavior; but some students may think that it is unfair to punish them for another student’s misbehavior. Finally, reminding the class (and Tom) of its own interest in learning and its usual standards of behavior might work if the class does, in fact, value academic achievement and good behavior.

Research in education and psychology bears directly on the decision Mr. Harris must make. Developmental research indicates that as students enter adolescence, the peer group becomes all-important to them, and they try to establish their independence from adult control, often by flouting or ignoring rules. Basic research on behavioral learning theories shows that when a behavior is repeated many times, some reward must be encouraging the behavior, and that if the behavior is to be eliminated, the reward must first be identified and removed. This research would also suggest that Mr. Harris consider problems with the use of punishment (such as scolding) to stop undesirable behavior. Research on specific classroom management strategies has identified effective methods to use both to prevent a student like Tom from misbehaving in the first place and to deal with his misbehavior when it does occur. Finally, research on rule setting and classroom standards indicates that student participation in setting rules can help convince each student that the class as a whole values academic achievement and appropriate behavior, and that this belief can help keep individual students in line.

Armed with this information, Mr. Harris can choose a response to Tom’s behavior based on an understanding of why Tom is doing what he is doing and what strategies are available to deal with the situation. He may or may not make the right choice, but because he knows several theories that could explain Tom’s behavior, he will be able to observe the outcomes of his strategy and, if it is ineffective, to learn from that and try something else that will work. Research does not give Mr. Harris a specific solution; that requires his own experience and judgment. But research does give Mr. Harris basic concepts of human behavior to help him understand Tom’s motivations and an array of proven methods that might solve the problem. And using research to help him make teaching decisions is one way Mr. Harris can achieve a sense of his own efficacy as a teacher.

Research + Common Sense = Effective Teaching

As the case of Mr. Harris illustrates, no theory, no research, no book can tell teachers what to do in a given situation. Making the right decisions depends on the context within which the problem arises, the objectives you have in mind, and many other factors, all of which must be assessed in the light of educated common sense. For example, research in mathematics instruction usually finds that a rapid pace of instruction increases achievement (Good, Grouws, & Ebmeier, 1983). Yet you may quite legitimately slow down and spend a lot of time on a concept that is particularly critical or may let students take time to discover a mathematical principle on their own. It is usually much more efficient (that is, it takes less time) to teach students skills or information directly than it is to let them make discoveries for themselves, but if you want students to gain a deeper understanding of a topic or to know how to find information or to figure things out for themselves, then the research findings about pace can be temporarily shelved.

The point is that although research in educational psychology can sometimes be translated directly to the classroom, it is best to apply the principles with a hefty dose of common sense and a clear view of what is being taught to whom and for what purpose.

Research on Effective Programs

Research in educational psychology not only provides evidence for principles of effective practice but also about the effectiveness of particular programs or practices (Fleischman, 2006). For example, in the vignette at the beginning of this chapter, Leah Washington uses a specific approach to creative writing instruction that has been extensively evaluated as a whole (Harris, Graham, & Pressley, 2001).
THEORY INTO PRACTICE

Teaching as Decision Making

If there were no educational problems to solve, there would be no need for teachers to function as professionals. Professionals distinguish themselves from nonprofessionals in part by the fact that they must make decisions that influence the course of their work. You must decide (1) how to recognize problems and issues, (2) how to consider situations from multiple perspectives, (3) how to call up relevant professional knowledge to formulate actions, (4) how to take the most appropriate action, and (5) how to judge the consequences (Silver, Strong, & Perini, 2007).

For example, Ms. O’Hara has a student named Shanika in her social studies class. Most of the time, Shanika is rather quiet and withdrawn. Her permanent record indicates considerable academic ability, but a casual observer would never know it. Ms. O’Hara asks herself the following questions:

1. What problems do I perceive in this situation? Is Shanika bored, tired, uninterested, or shy, or might her participation be inhibited by something I or others are doing or not doing? What theories of educational psychology might I consider?

2. I wonder what Shanika thinks about being in this class. Does she feel excluded? Does she care about the subject matter? Is she concerned about what I or others think about her lack of participation? Why or why not? What theories of motivation will help me make a decision?

3. What do I know from theory, research, or practice that might guide my actions to involve Shanika more directly in class activities?

4. What might I actually do in this situation to enhance Shanika’s involvement?

5. How would I know if I were successful with Shanika?

If Ms. O’Hara asks and tries to answer these questions—not only in the case of Shanika, of course, but for other students as well—she will improve her chances to learn about her work by doing her work. Philosopher John Dewey taught that the problems teachers face are the natural stimuli for reflective inquiry. Intentional teachers accept challenges and think productively about them (Marzano, 2012).

In other words, there is evidence that, on average, children whose teachers are using such methods learn to write better than those whose teachers use more traditional approaches. There is evidence on the effectiveness of dozens of widely used programs, from methods in particular subjects to strategies for reforming entire schools (see, for example, Dynarski, 2008/2009; Ellis, 2001b; Gunter, Estes, & Schwab, 2003; Slavin, Cheung, Groff, & Lake, 2008; Slavin & Lake, 2008; Slavin, Lake, Chambers, et al., 2009; Slavin, Lake, & Groff, 2009). An intentional teacher should be aware of research on programs for his or her subject and grade level and should be willing to seek out professional development opportunities in methods known to make a difference for children.

ON THE WEB

For educator-friendly reviews of research on effective programs, see bestevidence.org and ies.ed.gov (type WWC into the search engine).
Impact of Research on Educational Practice

Many researchers and educators have bemoaned the limited impact of research in educational psychology on teachers’ practices (see, for example, Kennedy, 2008). Indeed, research in education has nowhere near as great an impact on educational practice as research in medicine does on medical practice (Riehl, 2006). Yet research in education does have a profound indirect impact on educational practice, even if teachers are not aware of it. It affects educational policies, professional development programs, and teaching materials. For example, the Tennessee class size study (Finn, Pannozzo, & Achilles, 2003), which found important effects of class size in the early grades on student achievement, had a direct impact on state and federal proposals for class size reduction (Wasley, 2002). Research on beginning reading (National Reading Panel, 2000) dramatically transformed curriculum, instruction, and professional development for this subject. Research on the effects of career academies in high schools (Kemple, 1997) has led to a substantial increase in such programs.

It is important for you to become an intelligent consumer of research, not to take every finding or every expert’s pronouncement as truth from Mount Olympus (Fleischman, 2006; Gibbs, 2009; Slavin, 2011). The following section briefly describes the methods of research that most often produce findings of use to educators.

“In light of research on class size, we’re not cutting class, we’re helping our classmates get a better education!”

Certification Pointer

For teacher certification tests, you may need to show that you know how to access the professional literature, professional associations, and professional development activities to improve your teaching.

THEORY INTO PRACTICE

How to Be an Intelligent Consumer of Educational Psychology Research

Let’s say you’re in the market for a new car. Before laying out your hard-earned money, you’ll probably review the findings from various consumer research reports. You may want to know something about how various cars have performed in crash tests, which cars have the best gas mileage, or the trade-in values of particular models. Before embarking on this major investment, you want to feel as confident as you can about your decision. If you’ve been in this situation before, you probably remember that all of your research helped you make an informed decision.

Now that you are about to enter the profession of teaching, you should apply a similar consumer orientation in your decision making. As a teacher, you will be called on to make hundreds of decisions each day. Your car-buying decision is influenced by a combination of sound research findings and common sense, and your decisions about teaching and learning should follow this same pattern. Teaching and learning are complex concepts subject to a wide variety of influences, so your knowledge of relevant research will serve to guide you into making informed choices.

How can knowing the simple formula research + common sense = effective teaching help you to be a more intelligent consumer of educational psychology research? The following recommendations show how you can put this formula into practice:

1. Be a consumer of relevant research. It’s obvious you can’t apply what you don’t know. As a professional, you should maintain a working knowledge of relevant research. In addition to your course textbooks, which will be excellent resources for you in the future, you should become familiar with the professional journals in your field. Teacher-oriented journals such as Educational Leadership and Phi Delta Kappan contain easy-to-read summaries of research, for example. Websites such as bestevidence.org summarize program evaluations in a user-friendly way. In addition, check out Annual Editions: Educational Psychology, a yearly publication that reprints articles from various professional journals. Don’t overlook the value of networking with other teachers, face
to face or via the Internet. The example of Ellen Mathis and Leah Washington is an excellent illustration of how collaboration can expand your knowledge of what works.

2. **Teach intentionally.** As stated earlier in this chapter, there is no recipe for the ingredients that make up a commonsense approach to teaching. However, behaviors consistent with being an intentional teacher are about as close as we can get. Intentional teachers are thoughtful. Like Mr. Harris, you should consider multiple perspectives on classroom situations. When you take action, be purposeful and think about why you do what you do. Like other intentional teachers, you can follow your actions with careful reflection, evaluating whether your actions have resulted in the desired outcomes. You probably learned about the “scientific method” sometime during high school. Intentional teachers employ such a method in teaching, formulating a working hypothesis based on observations and background knowledge, collecting data to test the hypothesis, effectively organizing and analyzing the data, drawing sound conclusions based on the data, and taking a course of action based on the conclusions. For many experienced teachers, this cycle becomes automatic and internalized. When applied systematically, these practices can serve to validate research and theory and, as a result, increase your growing professional knowledge base.

3. **Share your experiences.** When you combine knowledge of research with your professional common sense, you will find yourself engaged in more effective practices. As you and your students experience success, share your findings. Avenues for dissemination are endless. In addition to publishing articles in traditional sources such as professional journals and organizational newsletters, don’t overlook the importance of preparing schoolwide in-service demonstrations, papers for state and national professional conferences, and presentations to school boards. In addition, the Internet offers various newsgroups where teachers engage in ongoing discussions about their work.

**WHAT RESEARCH METHODS ARE USED IN EDUCATIONAL PSYCHOLOGY?**

How do we know what we know in educational psychology? As in any scientific field, knowledge comes from many sources. Sometimes researchers study schools, teachers, or students as they are, and sometimes they create special programs, or treatments, and study their effects on one or more variables (anything that can have more than one value, such as age, sex, achievement level, or attitudes). There is no one best or most useful approach to research; any method can be useful when applied to the right set of questions. The principal methods educational researchers use to learn about schools, teachers, students, and instruction are experiments, correlational studies, and descriptive research (see Henig, 2008/2009; Mertler & Charles, 2011; Slavin, 2008b).
Experiments

In an experiment, researchers can create special treatments and analyze their effects. In one classic study, Lepper, Greene, and Nisbett (1973) set up an experimental situation in which children used felt-tipped markers to draw pictures. Children in the experimental group (the group that received a treatment) were given a prize (a “good player award”) for drawing pictures. Children in a control group received no prizes. At the end of the experiment, all students were allowed to choose among various activities, including drawing with felt-tipped markers. The children who had received the prizes chose to continue drawing with felt-tipped markers about half as frequently as did those who had not received prizes. This result was interpreted as showing that rewarding individuals for doing a task they already liked could reduce their interest in doing the task when they were no longer rewarded.

The Lepper study illustrates several important aspects of experiments. First, the children were randomly assigned to receive prizes or not. For example, the children’s names might have been put on slips of paper that were dropped into a hat and then drawn at random for assignment to a “prize” or “no-prize” group. Random assignment ensured that the two groups were essentially equivalent before the experiment began. This equivalence is critical because if we were not sure that the two groups were equal before the experiment, we would not be able to tell whether it was the prizes that made the difference in their subsequent behavior.

A second feature of this study characteristic of experiments is that everything other than the treatment itself (the prizes) was kept the same for the prize and no-prize groups. The children played in the same rooms with the same materials and with the same adults present. The researcher who gave the prize spent the same amount of time watching the no-prize children draw. Only the prize itself was different for the two groups. The goal was to be sure that it was the treatment, not some other factor, that explained the difference between the two groups.

**LABORATORY EXPERIMENTS** The Lepper and colleagues (1973) study is an example of a laboratory experiment. Even though the experiment took place in a school building, the researchers created a highly artificial, structured setting that existed for a very brief period of time. The advantage of laboratory experiments is that they permit researchers to exert a very high degree of control over all the factors involved in the study. However, laboratory experiments are high in internal validity, which is to say that we can confidently attribute any differences they find to the treatments themselves (rather than to other factors). The primary limitation of laboratory experiments is that they are typically so artificial and so brief that their results may have little relevance to real-life situations. For example, the Lepper et al. study, which was later repeated several times, was used to support a theory that rewards can diminish individuals’ interest in an activity when the rewards are withdrawn. This theory served as the basis for attacks on the use of classroom rewards, such as grades and stars. However, later research in real classrooms using real rewards has generally failed to find such effects (see Cameron & Pierce, 1994). This finding does not discredit the Lepper and colleagues study; it does show that theories based on artificial laboratory experiments cannot be assumed to apply to all situations in real life but must be tested in the real settings.

**RANDOMIZED FIELD EXPERIMENTS** Another kind of experiment that is often used in educational research is the randomized field experiment, in which instructional programs or other practical treatments are evaluated over relatively long periods in real classes under realistic conditions (Levin et al., 2003; Mosteller & Boruch, 2002). For example, Pinnell, Lyons, DeFord, Bryk, and Seltzer (1994) compared four approaches to reading instruction for first-graders at risk of reading failure, including Reading Recovery, a one-to-one tutoring model for first-graders at risk of that requires extensive training. In each of 10 schools, the 10 lowest-performing students were identified. Four were assigned at random to the experimental group using Reading Recovery, and 6 were assigned to a control group. Control group students continued to receive the reading program and remedial services they would have received anyway.

After 4 months (in February), all children were tested. Reading Recovery children scored significantly higher than control students on each of four measures. The following October, students were tested again, and Reading Recovery students still performed significantly better than control students.

Note the similarities and differences between the Pinnell and colleagues (1994) randomized field experiment and the Lepper and colleagues (1973) laboratory experiment. Both used random assignment to make sure that the experimental and control groups were essentially equal at the start of the study. Both tried to make all factors except the treatment equal for the experimental and control
groups, but the Pinnell and colleagues study was (by its very nature as a field experiment) less able to do this. For example, experimental and control students were taught by different teachers. Because many teachers were involved, this factor probably balanced out, but the fact remains that in real schools, control is never as great as in a laboratory situation. On the other hand, the fact that the Pinnell and colleagues study took place over a long period of time in real classrooms means that its external validity (real-life meaning) is far greater than that of the Lepper and colleagues study. That is, the results of the Pinnell and colleagues study have direct relevance to reading instruction for first-graders who are at risk.

Both laboratory experiments and randomized field experiments make important contributions to the science of educational psychology. Laboratory experiments are primarily important in researchers’ efforts to build and test theories, whereas randomized field experiments are the acid test for evaluating practical programs or improvements in instruction. For example, the writing process approach of Leah Washington has been evaluated many times in comparison to traditional methods and found to be highly effective (Harris et al., 2001). This finding is not a guarantee that this method will work in every situation, but it does give you a good direction to follow to improve writing.

The U.S. Department of Education has begun to strongly emphasize research as a basis for practice in education. These policies, and new funding to support randomized experiments, have greatly increased interest in this type of research. You can expect to see many more randomized studies in the coming years, and these studies will matter a great deal for policy and practice (see Mosteller & Boruch, 2002; Slavin, 2003).

Randomized field experiments are very difficult to conduct in education, as it is rare that teachers are happy to be assigned by chance to one group or another. For this reason, field experiments often use matching, in which teachers or schools using one method would be matched with those using a different method or with a control group. For example, Calderón, Hertz-Lazarowitz, and Slavin (1998) evaluated a program called Bilingual Cooperative Integrated Reading and Composition (BCIRC) in El Paso, Texas, elementary schools. English learners in three schools using BCIRC were matched with control schools of very similar students, based on prior achievement levels, socioeconomic status, and other factors. After pretesting, both sets of schools were followed for 2 years. On posttests, students in the BCIRC schools scored higher on reading measures than those in the control schools.

Matching is more practical than random assignment, but its results must be carefully interpreted because there may be reasons that one group of educators took on one method whereas another group did not. Were the teachers in the treatment group more motivated? Did they have greater resources? On the other hand, were they more desperate to try something new? In a matched study, these possibilities need to be considered and ruled out as much as possible (Mertler & Charles, 2011).

SINGLE-CASE EXPERIMENTS One experimental method occasionally used in educational research is the single-case experiment (see Franklin, Allison, & Gorman, 1997; Neuman & McCormick, 1995). In one typical form of this type of experiment, a single student’s behavior may be observed for several days. Then a special program is begun, and the student’s behavior under the new program is observed. Finally, the new program is withdrawn. If the student’s behavior improves under the special program but the improvement disappears when the program is withdrawn, the implication is that the program has affected the student’s behavior. Sometimes the “single case” can be several students, an entire class, or a school given the same treatment.

An example of a single-case experiment is a classic study by Barrish, Saunders, and Wolf (1969). In this study, a fourth-grade class was the single case. Observers recorded the percentage of time that at least one student in the class was talking out (talking without permission) or out of their seat during reading and math periods. After 10 days, a special program was introduced. The class was divided into two large teams, and whenever any student on a team misbehaved, the team was given a check mark. At the end of each day, the team with fewer check marks (or both teams if both received fewer than five check marks) could take part in a 30-minute free period.

The results of this study are illustrated in Figure 1.2. Before the Good Behavior Game began (baseline), at least one student in the math class was talking out 96 percent of the time, and at least one student was out of his or her seat without permission 82 percent of the time. When the game was instituted in math, the class’s behavior improved dramatically. When the game was withdrawn, the class’s behavior got worse again but improved once more when the game was reintroduced. Note that when the game was also introduced in reading class, student behaviors again improved. The fact that the program made a difference in both math and reading gives us even greater confidence that the Good Behavior Game is effective.
One important limitation of the single-case experiment is that it can be used only to study outcomes that can be measured frequently. For this reason, most single-case studies involve observable behaviors, such as talking out and being out of seat, which can be measured every day or many times per day.

**Correlational Studies**

Perhaps the most frequently used research method in educational psychology is the **correlational study**. In contrast to an experiment, in which the researcher deliberately changes one variable to see how this change will affect other variables, in correlational research the researcher studies variables as they are to see whether they are related. Variables can be positively correlated, negatively correlated, or uncorrelated. An example of a **positive correlation** is the relationship between reading achievement and mathematics achievement. In general, someone who is better than average in reading will also be better than average in math. Of course, some students who are good readers are not good in math, and vice versa; but on the average, skills in one academic area are positively correlated with skills in other...
academic areas. When one variable is high, the other tends also to be high. An example of a **negative correlation** is days absent and grades. The more days a student is absent, the lower his or her grades are likely to be; when one variable is high, the other tends to be low. With **uncorrelated variables**, in contrast, there is no correspondence between them. For example, student achievement in Poughkeepsie, New York, is probably completely unrelated to the level of student motivation in Portland, Oregon.

One classic example of correlational research is a study by Lahaderne (1968), who investigated the relationship between students’ attentiveness in class and their achievements and IQs. She observed 125 students in four sixth-grade classes to see how much of the time students were paying attention (e.g., listening to the teacher and doing assigned work). She then correlated attentiveness with achievement in reading, arithmetic, and language and with students’ IQs and attitudes toward school. The advantage of correlational studies is that they allow the researcher to study variables as they are, without creating artificial situations. Many important research questions can be studied only in correlational studies. For example, if we wanted to study the relationship between gender and math achievement, we could hardly randomly assign students to be boys or girls! Also, correlational studies let researchers study the interrelationships of many variables at the same time.

The principal disadvantage of correlational methods is that though they may tell us that two variables are related, they do not tell us what causes what. The Lahaderne study of attentiveness, achievement, and IQ raised the question: Does student attentiveness cause high achievement, or are high-ability, high-achieving students simply more attentive than other students? A correlational study cannot answer this question completely. However, correlational researchers do typically use statistical methods to try to determine what causes what. In Lahaderne’s study, it would have been possible to find out whether, among students with the same IQ, attentiveness was related to achievement. For example, given two students of average intelligence, will the one who is more attentive tend to achieve more? If not, then we may conclude that the relationship between attentiveness and achievement is simply the result of high-IQ students being more attentive and higher achieving than other students, not the result of any effect of attention on achievement.

Figure 1.3 illustrates two possible explanations for the correlation of attentiveness to achievement and IQ. In Explanation **A**, attentiveness causes achievement. In Explanation **B**, both attentiveness

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**FIGURE 1.3 • Possible Explanations for Correlations between Attentiveness, Achievement, and IQ**

Correlational studies can show that variables are related, but such studies cannot prove what causes what. In Lahaderne’s (1968) study, for example, did the attentiveness of the students cause higher achievement scores (Explanation **A**), or did a third factor—intelligence—determine both attentiveness and performance on achievement tests (as diagrammed in Explanation **B**)? Both explanations are partially correct.
and achievement are assumed to be caused by a third variable, IQ. Which is correct? Evidence from other research on this relationship suggests that both explanations are partially correct—that even when the effect of IQ is removed, student attentiveness is related to achievement.

Another illustration of correlational research is a study by Lubienski and Lubienski (2006) that used data from the National Assessment of Education Progress (NAEP) to ask whether public or private schools produce better reading and math performance. Of course, students in private schools have higher achievement scores, because they enroll students from wealthier, better-educated families. However, statistically controlling for students’ ethnicity, wealth, and other background factors, the researchers found that public school students scored at least as well as similar students in private schools.

### Descriptive Research

Experimental research and correlational research look for relationships between variables. However, some research in educational psychology simply seeks to describe a situation of interest. For example, the National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network (2005) did a national observational study in 780 third-grade classrooms to describe the wide range of classroom environments children experience. Among other things, the study found that most time in third grade focuses on basic skills, with little time for higher-order skills, but there was enormous variation. In another example, Mosenthal and colleagues (2004) observed and described six schools in Vermont that consistently had extraordinary reading scores, finding that such schools had particularly focused teachers who constantly evaluated their own teaching. One type of descriptive research is a survey or interview. Another, called ethnography, involves observation of a social setting (such as a classroom or school) over an extended period. As an example of ethnography, Anagnostopoulos (2006) spent a year in a Chicago high school observing and interviewing teachers and students to understand their response to a new policy that required students to pass a test for promotion to the next grade. She found that both students and teachers mentally divided retained students into two categories—“true demotes” and “real students”—in which the “true demotes” were “bad kids” who deserved to be retained and the “real students” were students who, they thought, did not really deserve to be retained. Descriptive studies provide a much more complete story of what happens in schools and classrooms than could studies that boil down findings into cold, hard numbers. Descriptive research usually does not have the scientific objectivity of correlational or experimental research, but it makes up for this lack in richness of detail and interpretation (Creswell, 2002; Northcutt & McCoy, 2004; Rossman & Rallis, 2003).

Developmental psychologists use descriptive research extensively to identify characteristics of children at different ages. The most important research in developmental psychology was done by the Swiss psychologist Jean Piaget (1952b), who began by carefully observing his own children. As a result of his observations, he developed a theory that describes the cognitive development of children from infancy through adolescence (Wadsworth, 2004).

### Action Research

**Action research** is a particular form of descriptive research that is carried out by educators in their own classrooms or schools (A. P. Johnson, 2012; Cunningham, 2011; Mills, 2011; Stringer, 2008). In action research, a teacher or principal might try out a new teaching method or school organization strategy, collect information about how it worked, and communicate this information to others. Because the people involved in the experiment are the educators themselves, action research lacks the objectivity sought in other forms of research, but it can provide deeper insight from front-line teachers or administrators than would be possible in research done by outsiders.

In order to carry out an action research project, a teacher or group of teachers might do the following (see Mills, 2011):

1. **Start with a good question, one that you care about and that addresses an important problem of educational practice.** For example, you might want to test out the usefulness of a new approach to teaching creative writing, or find out whether students do better during periods at different times of the day, or find out how students feel about a new schoolwide discipline policy.

2. **Find out what’s already known on the topic.** You might search the Internet to find out what other teachers and researchers have found out about your question in the past. This might
give you ideas about how to do your own project and may lead you to change or sharpen the question itself.

3. **Plan how you’ll collect data.** How will you find out a satisfying answer to your question? You might collect test scores, portfolios, interviews, questionnaires, observations, or other indicators. You might establish a point of comparison, such as what similar students did last year, or what similar students or teachers do in other classes. In order to maintain greater objectivity, you might arrange to have someone beside yourself do any data collection in which judgment is involved. For example, if you are evaluating students’ science experiments in an innovative science program, you might ask colleagues or volunteers from a local university to rate your students’ projects in comparison to what your students did last year. Depending on how much your project involves activities or (especially) data collection that goes beyond what students ordinarily experience, you may need district permission to do your study, and this may require parent permission.

4. **Carry out your study.** Put your project into action. For example, start teaching your new curriculum or start collecting information about students’ responses to a new policy. A great thing about action research is that you can change it over time. The object is to learn as much as you can, not to stick unreasonably to a set of procedures.

5. **Interpret your findings.** When you have your data in hand, you’ll need to do whatever ratings, averages, or other analyses you need. Then you should summarize your findings. Focus your summary on your original question, what others have learned about it, what you did, and what you found out. If you are doing action research for a course or other purpose there will be a format to follow, but if you did it for your own purposes, write clearly, briefly, and simply to communicate what you learned.

**HOW CAN I BECOME AN INTENTIONAL TEACHER?**

Think about the best, most intentional teachers you ever had—the ones who seemed so confident, so caring, so skilled, so enthusiastic about their subject. Chances are, when they took educational psychology, they were as scared, uncertain, and overwhelmed about becoming a teacher as you might be today. Yet they kept at it and made themselves the great teachers you remember. You can do the same.

**Teacher Certification**

Before you can become an intentional teacher, you have to become a certified teacher. Each state, province, and country has its own requirements, but in most places you at least have to graduate from a 4-year college with a specified distribution of courses, although various alternative certification programs exist as well. You also will need to have a satisfactory student teaching experience. In most states, however, these are not enough. You also have to pass a teacher certification test, or licensure test. Many states base their requirements on the 10 principles of effective teaching shown in Figure 1.4. Developed by the Interstate Teacher Assessment and Support Consortium (InTASC), they form the basis for most teacher certification tests, whether developed by InTASC, by the Educational Testing Service (ETS), or by individual state departments of education (see Darling-Hammond, 2008).

The Praxis Series™ Professional Assessments for Beginning Teachers, developed by the Educational Testing Service, is the most common test used by states to certify teachers (ETS, 2012). The Praxis Series includes three categories of assessment that correlate to significant stages in teacher development: Praxis I: Academic Skills Assessment for entering a teacher training program, Praxis II: Subject Assessments for licensure for entering the profession, and Praxis III: Classroom Performance Assessments after the first year of teaching. Praxis II measures both general teaching skills and subject knowledge of over 120 topics ranging from Agriculture to World Literature. It is the test you take upon completing your teacher preparation program.

Detailed information about the Praxis series of tests can be found at ets.org. From this website you can access the tests-at-a-glance page, which includes test outlines, sample questions with explanations for the best answers, and test-taking strategies. There is also a list of state-by-state
Standard #1: Learner Development
The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.

Standard #2: Learning Differences
The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.

Standard #3: Learning Environments
The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.

Standard #4: Content Knowledge
The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

Standard #5: Application of Content
The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

Standard #6: Assessment
The teacher understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.

Standard #7: Planning for Instruction
The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

Standard #8: Instructional Strategies
The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

Standard #9: Professional Learning and Ethical Practice
The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner.

Standard #10: Leadership and Collaboration
The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession.

FIGURE 1.4  Interstate Teacher Assessment and Support Consortium (InTASC)
Model Core Teaching Standards

requirements to determine which Praxis tests each state uses, if any. Note that individual universities may also use Praxis, even if their states do not require it.

Each state, province, or institution that uses the Praxis tests sets its own passing requirements. The passing score for each test for each state is listed on the website and in a booklet you receive with your score report.
Many states, including California, Texas, Florida, and New York, have developed or are developing their own teacher certification tests. These usually include sections much like the Praxis Principles of Learning and Teaching.

Throughout this book you will find tips on topics likely to appear on teacher certification tests. These marginal notes, called Certification Pointers, highlight knowledge that is frequently required on state teacher licensure exams, including Praxis Principles of Learning and Teaching. Also see the appendix at the end of the book that correlates the content of each chapter to corresponding topics within the Praxis Principles of Learning and Teaching exam.

**Beyond Certification**

Getting a teaching certificate is necessary but not sufficient to become an intentional teacher. Starting with your student teaching experience and continuing into your first job, you can create or take advantage of opportunities to develop your skills as an intentional teacher in a number of ways.

**SEEK MENTORS** Experienced teachers who are themselves intentional teachers are your best resource (Nieto, 2009). Not only are they highly effective, but they also understand and can describe what they're doing (and, hopefully, can help you learn to do those things). Talk with experienced teachers in your school, observe them teaching, and ask them to observe you and share ideas, as Ellen Mathis did in the vignette at the beginning of this chapter. Many school systems provide induction programs to help new teachers develop in the crucial first years, but even if yours does not, you can create one for yourself by seeking out experienced and helpful mentors.

**SEEK PROFESSIONAL DEVELOPMENT** Districts, universities, state departments of education, and other institutions provide all sorts of professional development workshops for teachers on a wide range of topics. Take advantage of every opportunity to participate. The best professional development includes some sort of coaching or follow-up, in which someone who knows a given technique or program comes to your class to observe you trying to use the program and gives you feedback (see Darling-Hammond & Richardson, 2009; Hirsh & Hord, 2008; Neufield & Roper, 2003). Workshops in which many teachers from your school participate together, and then have opportunities to discuss successes and challenges, can also be very effective (see Calderón, 1999).

**TALK TEACHING** Talk to your colleagues, your former classmates, your friends who teach, even your friends who don’t teach. Share your successes, your failures, your questions. Teaching can be an isolating experience if it’s just you and your students. Take every opportunity to share ideas and commiserate with sympathetic colleagues (Nieto, 2009). Join a book club to discuss articles and books on teaching (Hoerr, 2009).

**ON THE WEB**

When your friends and colleagues are worn out from your passion for teaching, try virtual colleagues on the Web. The following examples are just a few of the many teacher-oriented websites and blogs that offer opportunities to share advice, opinions, and observations (Ferriter, 2009a, b).

- Blogger (blogger.com)
- Edublogs (edublogs.com)
- The Knowledge Loom (knowledgeloom.org)
- K–12 Professional Circle (nces.ed.gov)
- Typepad (typepad.com)
- The Vent (proteacher.com)

There are websites for elementary teachers (elementary-teacher-resources.com), for middle school teachers (middleschool.net), and for teachers of various subjects, by topic (sitesforteachers.com). Resources for middle school science teachers can be found at sidirectory.com. Resources for teachers using technology in their classrooms can be found at the Networked Learning Community (learnweb.harvard.edu).
Chapter One

PROFESSIONAL PUBLICATIONS AND ASSOCIATIONS Intentional teachers do a lot of reading. Your school may subscribe to teacher-oriented journals, or you might choose to do so. For example, look for Teacher Magazine, Theory Into Practice, Learning Young Children, Phi Delta Kappan, Educational Leadership, or subject-specific journals such as Reading Teacher and Mathematics Teacher. Take a look at Edutopia (online at edutopia.org).

In addition, check out professional associations in your subject area or area of interest. The national teachers’ unions—the American Federation of Teachers (AFT) and National Education Association (NEA)—have publications, workshops, and other resources from which you can benefit greatly. Your state department of education, regional educational laboratory, or school district office may also have useful resources. A few useful websites include the following:

American Educational Research Association: aera.net
American Federation of Teachers: aft.org
Canadian Educational Research Association: cea-ace.ca
Council for Exceptional Children: ccc.sped.org
International Reading Association: reading.org
National Association for Bilingual Education: nabe.org
National Association for the Education of Young Children: naeyc.org
National Association of Black School Educators: nabse.org
National Council for the Social Studies: ncss.org
National Council of Teachers of English: ncte.org
National Council of Teachers of Mathematics: nctm.org
National Education Association: nea.org
National Institute for Literacy: nifl.gov
National Middle School Association: nmsa.org
National Science Teachers Association: nsta.org

ON THE WEB
To find journals reporting research in education, try the following:

Educational Leadership: ascd.org
Phi Delta Kappan: pdkintl.org
Reading Teacher: reading.org
Theory into Practice: ehe.osu.edu
Journal of Teaching Writing: journals.iupui.edu
Journal of Effective Teaching: uncw.edu
Education Week: edweek.org
Instructor Magazine: teacher.scholastic.com
Journal of Research in Childhood Education: tandfonline.com
Review of Educational Research: rer.sagepub.com
Better: Evidence-Based Education: bestevidence.org
SUMMARY

What Makes a Good Teacher?
Good teachers know their subject matter and have mastered pedagogical skills. They accomplish all the tasks involved in effective instruction with warmth, enthusiasm, and caring. They are intentional teachers, and they use principles of educational psychology in their decision making and teaching. They combine research and common sense.

What Is the Role of Research in Educational Psychology?
Educational psychology is the systematic study of learners, learning, and teaching. Research in educational psychology focuses on the processes by which information, skills, values, and attitudes are communicated between teachers and students in the classroom and on applications of the principles of psychology to instructional practices. Such research shapes educational policies, professional development programs, and teaching materials.

What Research Methods Are Used in Educational Psychology?
Experimental research involves testing particular educational programs or treatments. Random assignment of experimental subjects into groups before the testing helps to ensure that groups are equivalent and findings will be valid. An experimental group receiving the treatment is matched with a control group whose members do not receive treatment. Laboratory experiments are highly structured and short term. All the variables involved are strictly controlled. Randomized field experiments are less structured and take place over a long period of time under realistic conditions in which not all variables can be controlled. A single-case experiment involves observation of one student or group of students over a specified period before and after treatment. Correlational studies examine variables to see whether they are related. Variables can be positively correlated, negatively correlated, or uncorrelated. Correlational studies provide information about variables without manipulating them or creating artificial situations. However, they do not indicate the causes of relationships between variables.

Descriptive research uses surveys, interviews, and observations to describe behavior in social settings.

How Can I Become an Intentional Teacher?
Before you can become an intentional teacher, you have to become a certified teacher. Each state has its own requirements regarding education, student teaching, and licensure testing. These include the Test for Teaching Knowledge and the Praxis series. You can further develop your skills as an intentional teacher by seeking mentors, pursuing professional development, and talking to colleagues and friends about your experiences.

KEY TERMS

Review the following key terms from the chapter.

- action research 20
- Common Core standards 9
- control group 16
- correlational study 18
- critical thinking 8
- descriptive research 20
- educational psychology 4
- experiment 16
- experimental group 16
- external validity 17
- intentionality 6
- internal validity 16
- laboratory experiment 16
- law 10
- negative correlation 19
- pedagogy 5
- positive correlation 18
- principle 10
- random assignment 16
- randomized field experiment 16
- single-case experiment 17
- teacher efficacy 7
- theory 10
- treatment 15
- uncorrelated variables 19
- variable 15
SELF-ASSESSMENT:
PRACTICING FOR LICENSURE

Directions: The chapter-opening vignette addresses indicators that are often assessed in state licensure exams. Reread the chapter-opening vignette and then respond to the following questions.

1. In the first paragraph, Ellen Mathis does not understand why her students are nonproductive and unimaginative in their writing. According to educational psychology research, which of the following teacher characteristics is Ellen most likely lacking?
   a. Classroom management skills
   b. Content knowledge
   c. Intentionality
   d. Common sense

2. Leah Washington talks with Ellen Mathis about getting students to write interesting compositions. Which of the following statements summarizes Leah’s approach to teaching writing?
   a. Select teaching methods, learning activities, and instructional materials that are appropriate and motivating for students.
   b. Have students of similar abilities work together so the teacher can adapt instruction to meet the needs of each group.
   c. When working on writing activities, consider the teacher to be the instruction center.
   d. Individualization is the first goal of instruction; direct instruction is the second goal.

3. According to research on expertise development, what characteristic separates novice teachers from expert teachers?
   a. Novice teachers tend to rely on their pedagogical skills because their content knowledge is less complex than that of experts.
   b. Expert teachers do more short-term memory processing than novices because their thinking is more complex.
   c. Novice teachers have to constantly upgrade and examine their own teaching practices, whereas experts use a “best practices” approach.
   d. Expert teachers are critical thinkers.

4. Educational psychologists are often accused of studying the obvious. However, they have learned that the obvious is not always true. All of the following statements demonstrate this idea except one. Which one is obvious and supported by research?
   a. Student achievement is increased when students are assigned to classes according to their ability.
   b. Scolding students for misbehavior improves student behavior.
   c. Whole-class instruction is more effective than individualized instruction.
   d. Intentional teachers balance competing goals according to the needs of particular students and situations.

5. Leah Washington discusses many of her teaching strategies with Ellen Mathis. One can easily see that Leah views teaching as a decision-making process. She recognizes problems and issues, considers situations from multiple perspectives, calls on her professional knowledge to formulate action, and
   a. selects the most appropriate action and judges the consequence.
   b. chooses a strategy that agrees with her individual beliefs about teaching.
   c. consults with expert teachers and administrators to assist with her plan of action.
   d. allows students to make instructional decisions based on their interests and needs.
6. The products of research are principles, laws, and theories. Leah Washington describes many principles and theories of educational psychology as she speaks with Ellen Mathis about teaching students to write compositions. First, describe an instruction action with which Ellen Mathis is having difficulties (e.g., Ellen assigns all students the same topic), and then describe principles and theories she can use to engage her students in exciting and meaningful lessons.

7. The goal of research in educational psychology is to examine questions of teaching and learning using objective methods. These research methods include experiments, correlational studies, descriptive research, and action research. Think of a research question, and then describe how you would go about answering your question using these methods.

8. Intentional teachers are aware of resources available for professional learning. They continually refine their practices to address the needs of all students. List four actions you could take to find information to help you teach your students with limited English proficiency.

Answer questions and receive instant feedback in your Pearson etext.
CHAPTER TWO
Cognitive, Language, and Literacy Development

CHAPTER OUTLINE
How Do Children Develop Cognitively?
   Aspects of Development
   Issues of Development
How Did Piaget View Cognitive Development?
   How Development Occurs
   Piaget’s Stages of Development
How Is Piaget’s Work Viewed Today?
   Criticisms and Revisions of Piaget’s Theory
   Neo-Piagetian Views of Development
How Did Vygotsky View Cognitive Development?
   How Development Occurs
How Did Bronfenbrenner View Development?
How Do Language and Literacy Develop?
   Language and Literacy Development during the Preschool Years
   Language and Literacy Development during the Elementary and Secondary Years

LEARNING OUTCOMES
At the end of this chapter, you should be able to:
   • Describe Vygostkian and Piagetian theories of human development
   • Identify ways you can set up your classroom to promote literacy development in young children
   • Identify the stages of language and literacy development during the elementary and middle school years
Overall the course of their first 18 years of life, children go through astounding changes. Most of these changes are obvious—children get bigger, smarter, more socially adept, and so on. However, many aspects of development are not so obvious. Individual children develop in different ways and at different rates, and development is influenced by biology, culture, parenting, education, and other factors. Every teacher needs to understand how children grow and develop to be able to understand how children learn and how best to teach them (Comer, 2005).

**HOW DO CHILDREN DEVELOP COGNITIVELY?**

The term *development* refers to how people grow, adapt, and change over the course of their lifetimes, through personality development, socioemotional development, cognitive development (thinking), and language development. This chapter begins with two major theorists of cognitive development whose ideas are widely accepted: Jean Piaget and Lev Vygotsky (see Bee & Boyd, 2010; Berk, 2013; Feldman, 2010; Keenan & Evans, 2010; Mahn & John-Steiner, 2013).

**Aspects of Development**

Children are not miniature adults. They think differently and see the world differently. One of the first requirements of effective teaching is that you understand how students think and how they view the world. Effective teaching strategies must take into account students' ages and stages of development. A bright third-grader might appear to be able to learn any kind of mathematics but in fact may not have the cognitive maturity to do the abstract thinking required for algebra. In the opening vignette, Ms. Wing's class is smart and motivated, yet they are working hard but haphazardly. None of them gets the right answer (which is that only the length of the string matters).

Patricia is astonished. The students know a lot about science, try hard, and work well together, yet they cannot solve the problem.

**USING YOUR EXPERIENCE**

**CRITICAL THINKING** Why do you think Patricia Wing’s class cannot solve the pendulum problem? What does her experience suggest to you about why teachers should consider children’s stages of development in their teaching?

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and nurture combine to influence development, with biological factors playing a stronger role in some aspects, such as physical development.

The argument about nature vs. nurture, heredity vs. environment, goes back to the Greeks (at least). An environmentalist philosopher, John Watson (1930, p. 82) put his position this way:

"I'll guarantee to take any (child) at random and train him to become . . . a doctor, lawyer, artist, merchant-chief, and yes, even beggar-man and thief, regardless of his talents, penchant, tendencies, abilities, vocations, and race of his ancestors. I admit that I am going beyond my facts . . . but so have the advocates of the contrary . . . for thousands of years.

While few scientists today would go as far as Watson, there remains much debate about the relative influences of genes and environment. One problem is that the two interact. For example, if a child is a little better at sports than other children at a young age, he or she may receive a lot more practice, encouragement, and training in sports, therefore becoming an outstanding athlete. So was that due to nature or nurture? Similarly, a child who shows promise in science at a young age may receive a lot of encouragement, leading him or her to develop motivation to learn science and seek science-related experiences. Nature or nurture? Obviously, nature and nurture are mixed up in any particular person or population. For educators, the key point is that while there is nothing to do about a child's genes, there is a lot to do about his or her environment to build skill, motivation, and self-confidence. There is no question that teachers and parents make a huge difference in children's learning, over and above whatever the children's genetic predispositions may be.

CONTINUOUS AND DISCONTINUOUS THEORIES A second issue revolves around the notion of how change occurs. Continuous theories of development, such as information-processing models (Halford, Baker, McCreden, & Baine, 2005; Munakata, 2006), assume that development occurs in a smooth progression as skills develop and experiences are provided by caregivers and the environment. Continuous theories emphasize the importance of environment rather than heredity in determining development.

A second perspective assumes that children progress through a set of predictable and invariant stages of development. In this case, change can be fairly abrupt when children advance to a new stage of development. All children are believed to acquire skills in the same sequence, although rates of progress differ from child to child. The abilities children gain in each subsequent stage are not simply "more of the same"; at each stage, children develop qualitatively different understandings, abilities, and beliefs. Skipping stages is rare or impossible, although at any given point the same child may exhibit behaviors characteristic of more than one stage (DeVries, 2008). In contrast to continuous theories, these discontinuous theories of development focus on inborn factors rather than environmental influences to explain change over time. Environmental conditions may have some influence on the pace of development, but the sequence of developmental steps is essentially fixed. According to this perspective, the 9-year-olds in Patricia Wing's class could not have solved the pendulum problem no matter how much they had been taught, because they had not reached a developmental stage that allows people to solve problems involving many factors at the same time.

Stage theorists, such as Piaget and Vygotsky, share the belief that distinct stages of development can be identified and described. However, the specifics of their theories differ significantly in the numbers of stages and in their details (see DeVries, 2008).

HOW DID PIAGET VIEW COGNITIVE DEVELOPMENT?

Jean Piaget, born in Switzerland in 1896, is the most influential developmental psychologist in the history of psychology (see Wadsworth, 2004). After receiving his doctorate in biology, he became more interested in psychology, basing his earliest theories on careful observation of his own three children. Piaget thought of himself as applying biological principles and methods to the study of human development, and many of the terms he introduced to psychology were drawn directly from biology.

Piaget explored both why and how mental abilities change over time. For Piaget, development depends in large part on the child's manipulation of and active interaction with the environment. In Piaget's view, knowledge comes from action (see DeVries, 2008; Wadsworth, 2004). Piaget's theory of cognitive development proposes that a child's intellect, or cognitive ability, progresses through four distinct stages. Each stage is characterized by the emergence of new abilities and ways of processing information. Many of the specifics of Piaget's theories have been
challenged in later research. In particular, many of the changes in cognitive functioning he described are now known to take place earlier, under certain circumstances. Nevertheless, Piaget’s work forms an essential basis for understanding child development.

How Development Occurs

SCHEMES Piaget believed that all children are born with an innate tendency to interact with and make sense of their environments. Young children demonstrate patterns of behavior or thinking, called schemes, that older children and adults also use in dealing with objects in the world. We use schemes to find out about and act in the world; each scheme treats all objects and events in the same way. When babies encounter a new object, how are they to know what this object is all about? According to Piaget, they will use the schemes they have developed and will find out whether the object makes a loud or soft sound when banged, what it tastes like, whether it gives milk, and whether it goes thud when dropped (see Figure 2.1).

ASSIMILATION AND ACCOMMODATION According to Piaget, adaptation is the process of adjusting schemes in response to the environment by means of assimilation and accommodation. Assimilation is the process of understanding a new object or event in terms of an existing scheme. If you give young infants small objects that they have never seen before but that resemble familiar objects, they are likely to grasp them, bite them, and bang them. In other words, they will try to use existing schemes to learn about these unknown things (see Figure 2.1b). Similarly, a high school student may have a studying scheme that involves putting information on cards and memorizing the cards’ contents. She may then try to apply this scheme to learn difficult concepts such as economics, for which this approach may not be effective.

FIGURE 2.1 • Schemes

Babies use patterns of behavior called schemes to learn about their world.

Banging is a favorite scheme used by babies to explore their world.

Assimilation occurs when they incorporate new objects into the scheme.

Accommodation occurs when a new object does not fit the existing scheme.

Connections 2.1

For information on schema theory (a topic related to schemes) in connection with information processing and memory, see Chapter 6.
The children in this classroom, while studying tadpoles, are learning something new about growth. They can assimilate the idea that the tadpole grows legs, but they need to accommodate their concept of growth to understand why the tadpole's tail gets smaller.

Sometimes, when old ways of dealing with the world simply don’t work, a child might modify an existing scheme in light of new information or a new experience, a process called accommodation. For example, if you give an egg to a baby who has a banging scheme for small objects, what will happen to the egg is obvious (Figure 2.1c). Less obvious, however, is what will happen to the baby’s banging scheme. Because of the unexpected consequences of banging the egg, the baby might change the scheme. In the future the baby might bang some objects hard and others softly. The high school student who studies only by means of memorization might learn to use a different strategy to study economics, such as discussing difficult concepts with a friend.

The baby who banged the egg and the student who tried to memorize rather than comprehend had to deal with situations that could not be fully handled by existing schemes. This, in Piaget’s theory, creates a state of disequilibrium, or an imbalance between what is understood and what is encountered. People naturally try to reduce such imbalances by focusing on the stimuli that cause the disequilibrium and developing new schemes or adapting old ones until equilibrium is restored. This process of restoring balance is called equilibration. According to Piaget, learning depends on this process. When equilibrium is upset, children have the opportunity to grow and develop. Eventually, qualitatively new ways of thinking about the world emerge, and children advance to a new stage of development. Piaget believed that physical experiences and manipulation of the environment are critical for developmental change to occur. However, he also believed that social interaction with peers, especially arguments and discussions, helps to clarify thinking and, eventually, to make it more logical. Research has stressed the importance of confronting students with experiences or data that do not fit into their current theories of how the world works as a means of advancing their cognitive development.

Piaget’s theory of development represents constructivism, a view of cognitive development as a process in which children actively build systems of meaning and understandings of reality through their experiences and interactions (Berk, 2013; Feldman, 2010; Wadsworth, 2004). In this view, children actively construct knowledge by continually assimilating and accommodating new information.

### Piaget’s Stages of Development

Piaget divided the cognitive development of children and adolescents into four stages: sensorimotor, preoperational, concrete operational, and formal operational. He believed that all children pass through these stages in this order and that no child can skip a stage, although different children pass through the stages at somewhat different rates. The same individuals may perform tasks associated with different stages at the same time, particularly at points of transition into a new stage. Table 2.1 summarizes the approximate ages at which children and adolescents pass through Piaget’s four stages. It also shows the major accomplishments of each stage.

#### SENSORIMOTOR STAGE (BIRTH TO AGE 2)

The earliest stage is called sensorimotor because during this stage babies and young children explore the world by using their senses and motor skills. Dramatic changes occur as infants progress through the sensorimotor period. Initially, all infants have inborn behaviors called reflexes. Touch a newborn’s lips, and the baby will begin to suck; place your finger in the palm of an infant’s hand, and the infant will grasp it. These and other innate behaviors are the building blocks from which the infant’s first schemes form.

### TABLE 2.1 • Piaget’s Stages of Cognitive Development

People progress through four stages of cognitive development between birth and adulthood, according to Jean Piaget. Each stage is marked by the emergence of new intellectual abilities that allow people to understand the world in increasingly complex ways.

<table>
<thead>
<tr>
<th>STAGE</th>
<th>APPROXIMATE AGES</th>
<th>MAJOR ACCOMPLISHMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor</td>
<td>Birth to 2 years</td>
<td>Formation of concept of “object permanence” and gradual progression from reflexive behavior to goal-directed behavior.</td>
</tr>
<tr>
<td>Preoperational</td>
<td>2 to 7 years</td>
<td>Development of the ability to use symbols to represent objects in the world. Thinking remains egocentric and centered.</td>
</tr>
<tr>
<td>Concrete operational</td>
<td>7 to 11 years</td>
<td>Improvement in ability to think logically. New abilities include the use of operations that are reversible. Thinking is decentered, and problem solving is less restricted by egocentrism. Abstract thinking is not possible.</td>
</tr>
<tr>
<td>Formal operational</td>
<td>11 years to adulthood</td>
<td>Abstract and purely symbolic thinking is possible. Problems can be solved through the use of systematic experimentation.</td>
</tr>
</tbody>
</table>
Infants soon learn to use these reflexes to produce more interesting and intentional patterns of behavior. This learning occurs initially through accident and then through more intentional trial-and-error efforts. According to Piaget, by the end of the sensorimotor stage, children have progressed from their earlier trial-and-error approach to a more planned approach to problem solving. For the first time they can mentally represent objects and events. What most of us would call “thinking” appears now. This is a major advance because it means that the child can think through and plan behavior. For example, suppose a 2-year-old is in the kitchen watching his mother prepare dinner. If the child knows where the step stool is kept, he may ask to have it set up to afford a better view of the counter and a better chance for a nibble. The child did not stumble on to this solution accidentally. Instead, he thought about the problem, figured out a possible solution that used the step stool, tried out the solution mentally, and only then tried the solution in practice (Trawick-Smith, 2010).

Another hallmark development of the sensorimotor period is the ability to grasp object permanence. Piaget argued that children must learn that objects are physically stable and exist even when the objects are not in the child’s physical presence. For example, if you cover an infant’s bottle with a towel, the child may not remove it, believing that the bottle is gone. By 2 years of age, children understand that objects exist even if they cannot be seen. Once they realize that things exist out of sight, children can start using symbols to represent these things in their minds so that they can think about them (Cohen & Cashon, 2003).

**PREOPERATIONAL STAGE (AGES 2 TO 7)** During the preoperational stage, children have greater ability to think about things and can use symbols to mentally represent objects (Massey, 2008). Their language and concepts develop at an incredible rate. Yet much of their thinking remains surprisingly primitive. One of Piaget’s earliest and most important discoveries was that young children lacked an understanding of the principle of conservation. For example, if you pour milk from a tall, narrow container into a shallow, wide one in the presence of a preoperational child, the child will firmly believe that the tall glass has more milk (see Figure 2.2). Similarly, a preoperational child is likely to believe that a sandwich cut in four pieces is more sandwich or that a line of blocks that is spread out contains more blocks than a line that is compressed, even after being shown that the number of blocks is identical.

Several aspects of preoperational thinking help to explain the error on conservation tasks. One characteristic is **centration**: paying attention to only one aspect of a situation. In the example illustrated in Figure 2.2, children might have claimed that there was less milk after it was poured into the wide container because they centered on the height of the milk, ignoring its width. At the bottom of Figure 2.2, children focus on the length of the line of blocks but ignore its density (or the actual number of blocks).

**Reversibility**, the ability to change direction in one’s thinking to return to a starting point, is another facet of thinking not yet developed by preoperational children. As adults, for example, we know that if \(7 + 5 = 12\), then \(12 - 5 = 7\). If we add 5 items to 7 items and then take the 5 items away (reverse what we’ve done), we are left with 7 items. If preoperational children could think this way, then they could mentally reverse the process of pouring the milk and realize that if the milk were poured back into the tall beaker, its quantity would not change.

Another characteristic of the preoperational child’s thinking is a focus on states. In the milk problem the milk is poured from one container to another. Preschoolers ignore this pouring process and focus only on the beginning state (milk in a tall glass) and end state (milk in a shallow dish). Unlike adults, the young preschooler forms concepts that vary in definition from situation to situation and are not always logical. How else can we explain the 2-year-old’s ability to treat a stuffed animal as an inanimate object one minute and an animate object the next? Eventually, though, the child’s concepts become more consistent and less private. Children become increasingly concerned that their definitions match other people’s. But they still lack the ability to coordinate one concept with another.

Finally, preoperational children are **ego-centric** in their thinking. Children at this stage believe that everyone sees the world exactly as they do. For example, Piaget and Inhelder (1956) seated children on one side of a display of three mountains and asked them to describe how the scene looked to a doll seated on the other side. Children below the age of 6 or 7 described the doll’s view as identical to their own, even though it was apparent to adults that this could not be so. Because preoperational children are unable to take the perspective of others, they often interpret events entirely in reference to themselves.
Although the differences between the mental abilities of preoperational preschoolers and concrete operational elementary school students are dramatic, concrete operational children still do not think like adults (Davis, 2008). They are very much rooted in the world as it is and have difficulty with abstract thought. Flavell describes the concrete operational child as taking “an earthbound, concrete, practical-minded sort of problem-solving approach, one that persistently fixates on the perceptible and inferable reality right there in front of him. A theorist the elementary-school child is not” (1986, p. 103). The term concrete operational stage reflects this earthbound approach. Children at this stage can form concepts, see relationships, and solve problems, but only as long as they involve objects and situations that are familiar.

During the elementary school years, children’s cognitive abilities undergo dramatic changes. Elementary school children no longer have difficulties with conservation problems because they have acquired the concept of reversibility. For example, they can now see that the amount of milk in the short, wide container must be the same as that in the tall, narrow container, because if the milk were poured back in the tall container, it would be at the same level as before. Another fundamental difference between preoperational and concrete operational children is that the preoperational child responds to perceived appearances, whereas the older concrete operational child responds to inferred reality. Flavell (1986) demonstrated this concept by showing children a red car and then, while they were still watching, covering it with a filter that made it appear black. When asked what color the car was, 3-year-olds responded “black,” and 6-year-olds responded “red.” The older concrete operational child is able to respond to inferred reality, seeing things in the context of other meanings; preschoolers see what they see, with little ability to infer the meaning behind what they see.

One important task that children learn during the concrete operational stage is seriation, or arranging things in a logical progression—for example, lining up sticks from smallest to largest.

**CONCRETE OPERATIONAL STAGE (AGES 7 TO 11)**

**Figure 2.2 • Some Piagetian Conservation Tasks**

Children at the preoperational stage cannot yet conserve. These tasks are mastered gradually over the concrete operational stage. Children in Western nations typically acquire conservation of number, mass, and liquid sometime between 6 and 7 years and of weight between 8 and 10 years.

<table>
<thead>
<tr>
<th>Conservation Problem</th>
<th>Beginning State (all identical)</th>
<th>Transformation</th>
<th>Ending State (something changed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid Quantity</strong></td>
<td><img src="media.png" alt="Do these glasses have the same amount of milk in them, or does one glass have more?" /></td>
<td><img src="media.png" alt="Pour milk from one glass to shallow bowl." /></td>
<td><img src="media.png" alt="Now do these glasses have the same amount of milk in them, or does one glass have more?" /></td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td><img src="media.png" alt="Are these sandwiches the same, or is one sandwich bigger?" /></td>
<td><img src="media.png" alt="Cut one sandwich into four pieces." /></td>
<td><img src="media.png" alt="Now are these sandwiches the same, or is one sandwich bigger?" /></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td><img src="media.png" alt="Are there the same number of blocks in each row, or does one row have more?" /></td>
<td><img src="media.png" alt="Spread out the blocks in one row." /></td>
<td><img src="media.png" alt="Now are there the same number of blocks in each row, or does one row have more?" /></td>
</tr>
</tbody>
</table>

* Figure 2.2 shows some Piagetian conservation tasks. Children at the preoperational stage cannot yet conserve. These tasks are mastered gradually over the concrete operational stage. Children in Western nations typically acquire conservation of number, mass, and liquid sometime between 6 and 7 years and of weight between 8 and 10 years.*
To do this, they must be able to order or classify objects according to some criterion or dimension, in this case length. Once this ability is acquired, children can master a related skill known as transitivity, the ability to infer a relationship between two objects on the basis of knowledge of their respective relationships with a third object. For example, if you tell preoperational preschoolers that Tom is taller than Becky and that Becky is taller than Fred, they will not see that Tom is taller than Fred. Logical inferences such as this are not possible until the stage of concrete operations, during which school-age children develop the ability to make two mental transformations that require reversible thinking. The first of these is inversion (+A is reversed by –A), and the second is reciprocity (A < B is reciprocated by B > A). By the end of the concrete operational stage, children have the mental abilities to learn how to add, subtract, multiply, and divide; to place numbers in order by size; and to classify objects by any number of criteria. Children can think about what would happen if . . . , as long as the objects are in view—for example, “What would happen if I pulled this spring and then let it go?” Children can understand time and space well enough to draw a map from their home to school and are building an understanding of events in the past.

Children in the elementary grades also are moving from egocentric thought to decentered or objective thought. Decentered thought allows children to see that others can have different perceptions than they do. For example, children with decentered thought will be able to understand that different children may see different patterns in clouds. Children whose thought processes are decentered are able to learn that events can be governed by physical laws, such as the laws of gravity. These changes do not all happen at the same time. Rather, they occur gradually during the concrete operational stage.

**FORMAL OPERATIONAL STAGE (AGE 11 TO ADULTHOOD)** Sometime around the onset of puberty, children’s thinking begins to develop into the form that is characteristic of adults (Horn, Drill, Hochberg, Heimze, & Frank, 2008; Packard & Babineau, 2008). The preadolescent begins to be able to think abstractly and to see possibilities beyond the here and now. These abilities continue to develop into adulthood. With the formal operational stage comes the ability to deal with potential or hypothetical situations; the form is now separate from the content.

Inhelder and Piaget (1958) described one task that is approached differently by elementary school students in the concrete operational stage than by adolescents in the formal operational stage—the pendulum problem that Patricia Wing gave to her third-graders. The children and adolescents were given a pendulum consisting of a string with a weight at the end. They could change the length of the string, the amount of weight, the height from which the pendulum was released, and the force with which the pendulum was pushed. They were asked which of these factors influenced the frequency (the number of swings per minute). Only the length of the string makes any difference in the frequency of the pendulum: The shorter the string, the more swings per minute. This experiment is illustrated in Figure 2.3. The adolescent who has reached the stage of formal operations is likely to proceed quite systematically, varying one factor at a time (e.g., leaving the string the same length and trying different weights). For example, in Inhelder and Piaget’s (1958) experiment, one 15-year-old selected 100 grams with a long string and a medium-length string, then 20 grams with a long and a short string, and finally 200 grams with a long and a short string and concluded, “It’s the length of the string that makes it go faster and slower; the weight doesn’t play any role” (p. 75). In contrast, 10-year-olds (who can be assumed to be in the concrete operational stage) proceeded in a chaotic fashion, varying many factors at the same time and hanging on to preconceptions. One boy varied simultaneously the weight and the push; then the weight, the push, and the length; then the push, the weight, and the elevation; and so on. He first concluded, “It’s by changing the weight and the push, certainly not the string.”

“How do you know that the string has nothing to do with it?”

“Because it’s the same string.”

He had not varied its length in the last several trials; previously, he had varied it simultaneously with the push, thus complicating the findings of the experiment (adapted from Inhelder and Piaget, 1958, p. 71).

The transitivity problem also illustrates the advances brought about by formal thought. Recall the concrete operational child who, when told that Tom was taller than Becky and Becky was taller than Fred, understood that Tom was taller than Fred. However, if the problem had been phrased in the following way, only an older child who had entered the formal operational stage would have solved it: “Becky is shorter than Tom, and Becky is taller than Fred. Who is the tallest of the three?” Here the younger concrete operational child might get lost in the combinations of greater-than and less-than
relationships. Adolescents in the formal operational stage can imagine several different relationships among the heights of Becky, Tom, and Fred and can figure out the accuracy of each until they hit on the correct one. This example shows another ability of preadolescents and adolescents who have reached the formal operational stage: They can monitor, or think about, their own thinking. Generating abstract relationships from available information and then comparing those abstract relationships to each other is a broadly applicable skill underlying many tasks in which adolescents’ competence leaps forward. Piaget (1952a) described a task in which students in the concrete operational stage were given a set of 10 proverbs and a set of statements with the same meanings as the proverbs. They were asked to match each proverb to the equivalent statement. Again, concrete operational children can understand the task and choose answers. However, their answers are often incorrect because they often do not understand that a proverb describes a general principle. For example, asked to explain the proverb “Don’t cry over spilled milk,” a child might explain that once milk is spilled, there’s nothing to cry about but might not see that the proverb has a broader meaning. The child is likely to respond to the concrete situation of spilled milk rather than understanding that the proverb means “Don’t dwell on past events that can’t be changed.” Adolescents and adults have little difficulty with this type of task.

HYPOTHETICAL CONDITIONS Another ability that Piaget and others recognized in the young adolescent is an aptitude to reason about situations and conditions that have not been experienced. The adolescent can accept, for the sake of argument or discussion, conditions that are arbitrary, that are not known to exist, or even that are known to be contrary to fact. Adolescents are not bound to their own experiences of reality, so they can apply logic to any given set of conditions. One illustration of the ability to reason about hypothetical situations is found in formal debate, in which participants must be prepared to defend either side of an issue, regardless of their personal feelings or experience, with their success judged on documentation and logical consistency. For a dramatic illustration of the difference between children and adolescents in the ability to suspend their own opinions, compare the reactions of fourth- and ninth-graders when you ask them to present an argument in favor of the proposition that schools should be in session 6 days a week, 48 weeks a year. The adolescent is far more likely to be able to set aside her or his own opinions and think of reasons why more days of school might be beneficial. The abilities that make up formal operational thought—thinking abstractly, testing hypotheses, and forming concepts that are independent of physical reality—are critical to acquiring higher-order skills. For example, learning algebra or abstract geometry requires the use of formal operational thought, as does understanding complex concepts in science, social studies, and other subjects.

The thinking characteristics of the formal operations stage usually appear between ages 11 and 15, but there are many individuals who never reach this stage (Niaz, 1997; Packard & Babcnau, 2008).
As many as two-thirds of U.S. high school students do not succeed on Piaget’s formal operations tasks (Meece & Daniels, 2008). Most individuals tend to use formal operational thinking in some situations and not others, and this remains true into adulthood.

**HOW IS PIAGET’S WORK VIEWED TODAY?**

Piaget’s theory revolutionized, and in many ways still dominates, the study of human development. However, some of his central principles have been questioned in more recent research, and modern descriptions of development have revised many of his views (see Feldman, 2010; Mercer, 2010).

**Criticisms and Revisions of Piaget’s Theory**

One important Piagetian principle is that development precedes learning. Piaget held that developmental stages were largely fixed and that such concepts as conservation could not be taught. However, research has established many cases in which Piagetian tasks can be taught to children at earlier developmental stages (Feldman, 2012). Several researchers have found that young children can succeed on simpler forms of Piaget’s tasks before they reach the stage at which that task is usually achieved (Gelman, 2000; Kuhn, 2006; Siegler & Svetina, 2006). Further, it is clear that children do not move, for example, from being nonconservers to conservers all at once. Instead, they typically master conservation of number (blocks rearranged are the same number of blocks) a year or two before they master conservation of weight (the weight of a ball of clay does not change if you flatten it) (Miller, 2011). Similarly, in simple, practical contexts, children demonstrated their ability to consider the point of view of others (Siegler, 2006) and infants have been shown to demonstrate aspects of object permanence much earlier than Piaget predicted (Baillargeon, 2002).

The result of this research has been a recognition that children are more competent than Piaget originally thought, especially when their practical knowledge is being assessed (Feldman, 2012). Piaget (1964) responded to demonstrations of this kind by arguing that the children must have been on the verge of the next developmental stage already—but the fact remains that some of the Piagetian tasks can be taught to children well below the age at which they usually appear without instruction.

Another point of criticism goes to the heart of Piaget’s “stage” theory. Many researchers now doubt that there are broad stages of development affecting all types of cognitive tasks; instead, they argue that children’s skills develop in different ways on different tasks and that their experience (including direct teaching in school or elsewhere) can have a strong influence on the pace of development (see Gelman, 2000; Miller, 2011; Siegler, 2006). The evidence is particularly strong that children can be taught to perform well on the Piagetian tasks assessing formal operations, such as the pendulum problem illustrated in Figure 2.3. Clearly, experience matters. Watch an intelligent adult learning to sail. Initially, he or she is likely to engage in a lot of concrete operational behavior, trying everything in a chaotic order, before systematically beginning to learn how to adjust the tiller and the sail to the wind and direction (as in formal operational thought).

**Neo-Piagetian Views of Development**

Neo-Piagetian theories are modifications of Piaget’s theory that attempt to overcome its limitations and address problems that critics have identified. In particular, neo-Piagetians have demonstrated that children’s abilities to operate at a particular stage depend a great deal on the specific tasks involved (Massey, 2008); that training and experience, including social interactions, can accelerate children’s development (Birney, Citron-Pousiy, Lutz, & Sternberg, 2005; Flavell, 2004; Siegler, 2006); and that culture has an important impact on development (Gelman, 2000; Greenfield, 2004).

Neo-Piagetians see cognitive development in terms of specific types of tasks instead of overall stages. For example, different tasks described as indicators of concrete operational thinking appear at very different ages (Cohen & Cashon, 2003; Halford & Andrews, 2006). Neo-Piagetians refer to “dialectical thinking,” the ability to see that real-life problems do not necessarily have a single solution (Sternberg, 2008). Influenced by Vygotsky (see the next section), Neo-Piagetians place a far greater emphasis than Piaget himself did on the impact of culture, social context, and education on the development process (Crisp & Turner, 2011; Maynard, 2008).
Piaget's theories have had a major impact on the theory and practice of education (DeVries, 2008; Driscoll & Nagel, 2008; Hustedt, Epstein, & Barnett, 2013; Ostroff, 2012; Seifert, 2013). The theories focused attention on the idea of **developmentally appropriate education**—an education with environments, curriculum, materials, and instruction that are suitable for students in terms of their physical and cognitive abilities and their social and emotional needs. Piagetian theory has been influential in constructivist models of learning, which will be described in Chapter 8. Berk (2013) summarizes the main teaching implications drawn from Piaget as follows:

1. **A focus on the process of children's thinking, not only its products.** In addition to checking the correctness of children's answers, teachers must understand the processes children use to get to the answer. Appropriate learning experiences build on children's current level of cognitive functioning, and only when teachers appreciate children's methods of arriving at particular conclusions are they in a position to provide such experiences.

2. **Recognition of the crucial role of children's self-initiated, active involvement in learning activities.** In a Piagetian classroom the presentation of ready-made knowledge is deemphasized, and children are encouraged to discover for themselves through spontaneous interaction with the environment. Therefore, instead of teaching didactically, teachers provide a rich variety of activities that permit children to act directly on the physical world.

3. **A deemphasis on practices aimed at making children adultlike in their thinking.** Piaget referred to the question “How can we speed up development?” as “the American question.” Among the many countries he visited, psychologists and educators in the United States seemed most interested in what techniques could be used to accelerate children’s progress through the stages. Piagetian-based educational programs accept his firm belief that premature teaching could be worse than no teaching at all because it leads to superficial acceptance of adult formulas rather than true cognitive understanding.

4. **Acceptance of individual differences in developmental progress.** Piaget’s theory assumes that all children go through the same developmental sequence but that they do so at different rates. Therefore, teachers must make a special effort to arrange classroom activities for individuals and small groups of children rather than for the total class group. In addition, because individual differences are expected, assessment of children's educational progress should be made in terms of each child’s own previous course of development rather than the performances of same-age peers.

**HOW DID VYGOTSKY VIEW COGNITIVE DEVELOPMENT?**

Lev Semionovich Vygotsky was a Russian psychologist who died in 1934. Although Piaget and Vygotsky never met, they were contemporaries who were aware of each other’s early work (DeVries, 2008). Vygotsky’s work was not widely read in English until the 1970s, however, and only since then have his theories become influential in North America. Vygotskian theory is
now a powerful force in developmental psychology, and many of the critiques he made of the Piagetian perspective more than 70 years ago have come to the fore today (see Danieli, Cole, & Wertsch, 2007; Gredler & Shields, 2008; John-Steiner & Mahn, 2003; Winsler, 2003).

Vygotsky's work is based on two key ideas. First, he proposed that intellectual development can be understood only in terms of the historical and cultural contexts children experience. Second, he believed that development depends on the **sign systems** that individuals grow up with: the symbols that cultures create to help people think, communicate, and solve problems—for example, a culture's language, writing system, or counting system. Focusing only on Western symbol systems, he argued, greatly underestimates cognitive development in diverse cultures (Mahn & John-Steiner, 2013; Schaller & Crandall, 2004). In contrast to Piaget, Vygotsky proposed that cognitive development is strongly linked to input from others.

### How Development Occurs

Recall that Piaget's theory suggests that development precedes learning. In other words, specific cognitive structures need to develop before certain types of learning can take place. Vygotsky's theory suggests that learning precedes development. For Vygotsky, learning involves the acquisition of signs by means of information from others and deliberate teaching. Development occurs as the child internalizes these signs so as to be able to think and solve problems without the help of others, an ability called **self-regulation**.

The first step in the development of self-regulation and independent thinking is learning that actions and sounds have a meaning. For example, a baby learns that the process of reaching toward an object is interpreted by others as a signal that the infant wants the object, and then reaches toward objects out of reach as a sign that he or she wants help getting the object. In the case of language acquisition, children learn to associate certain sounds with meaning. The second step in developing internal structures and self-regulation involves practice. The infant practices gestures that will get attention. The preschooler enters into conversations with others to master language. The final step is the use of signs to think and solve problems without the help of others. At this point, children become self-regulating, and the sign system has become internalized.

**PRIVATE SPEECH** Vygotsky proposed that children incorporate the speech of others and then use that speech to help themselves solve problems. **Private speech** is easy to see in young children, who frequently talk to themselves, especially when faced with difficult tasks (Corkum, Humphries, Mullane, & Theriault, 2008; Flavell, 2004). Later, private speech becomes silent but is still very important. Studies have found that children who make extensive use of private speech learn complex tasks more effectively than do other children (Al-Namlah, Fernyhough, & Meins, 2006; Emerson & Mullane, 2003; Schneider, 2002).

**THE ZONE OF PROXIMAL DEVELOPMENT** Vygotsky (1978) believed that learning takes place most effectively when children are working within their **zone of proximal development**. Tasks within the zone of proximal development are those that a child cannot yet accomplish alone but could accomplish with the assistance of more competent peers or adults. That is, the zone of proximal development describes tasks that a child has not yet learned but is capable of learning at a given time. Some educators refer to a “teachable moment” when a child or group of children is exactly at the point of readiness for a given concept (Berger, 2012). Vygotsky further believed that higher mental functioning usually exists in conversation and collaboration among individuals before it exists within the individual.

**MEDIATION** Vygotsky believed that complex skills, such as reasoning and problem solving, are developed via **mediation** with adults and higher-performing peers (Vygotsky, 1978; Wertsch, 2007). That is, older children and adults help learners by explaining, modeling, or breaking down complex skills, knowledge, or concepts. In this way they help learners obtain psychological tools, as when children are giving each other pointers on a computer game or modeling the use of debate strategies. The more knowledgeable peers or adults help the learner take the next learning step, but also add to the learner’s “cultural tool kit.” For example, imagine that two young drivers are driving together and the driver (unintentionally) skids around a corner. The passenger notes, “I always slow way down to keep that from happening.” This advice, from a peer in the exact moment when it is likely to be meaningful, will not only help the driver corner better, but will add to the
driver’s “cultural tool kit” of solutions for driving problems and sense of mastery of a task of enormous cultural importance in Western societies. In a traditional culture, where young adolescents go through puberty rites, peers might share ideas about ways to prepare for a rite of passage, such as surviving alone in the jungle for a week. Just as in the driving example, this sharing adds to the learner’s “cultural tool kit,” it’s just a different kit, designed for a different culture. Vygotsky’s point is that each culture outfits each of its members with such a kit through a process of mediation, passing on knowledge, skills, and experience from older to younger members of the society.

SCAFFOLDING A key idea derived from Vygotsky’s notion of social learning is that of scaffolding (John-Steiner & Mahn, 2003; Rogoff, 2003): the assistance provided by more competent peers or adults. Typically, scaffolding means providing a child with a great deal of support during the early stages of learning and then diminishing support and having the child take on increasing responsibility as soon as she or he is able. Scaffolding can be thought of as mediation on purpose, planfully helping a learner move from a current level of skill to independent capability to use a new skill. Parents use scaffolding when they teach their children to play a new game or to tie their shoes. A related concept is cognitive apprenticeship, which describes the entire process of modeling, coaching, scaffolding, and evaluation that is typically seen whenever one-to-one instruction takes place (John-Steiner & Mahn, 2003; Rogoff, 2003). For example, in Life on the Mississippi, Mark Twain describes how he was taught to be a steamboat pilot. At first the experienced pilot talked him through every bend in the river, but gradually he was left to figure things out for himself, with the pilot there to intervene only if the boat was about to run aground.

COOPERATIVE LEARNING Vygotsky’s theories support the use of cooperative learning strategies in which children work together to help one another learn (Slavin, 2011; Webb, 2008). Because peers are usually operating within each other’s zones of proximal development, they often provide models for each other of slightly more advanced thinking (Gredler, 2009). In addition, cooperative learning makes children’s inner speech available to others, so they can gain insight into one another’s reasoning process. That is, children benefit from hearing each other “thinking out loud,” especially when their groupmates talk themselves through a problem.

ON THE WEB
To learn more about applications of Vygotsky’s theories to education practice, visit mathforum.org. Vygotsky resources can be found at webpages.charter.net.

THEORY INTO PRACTICE
Classroom Applications of Vygotsky’s Theory
Vygotsky’s theories of education have major practical implications in the classroom (see Hustedt et al., 2013; Seifert, 2013). The concept of a zone of proximal development implies that only instruction and activities that fall within this zone can be learned. Teaching content that is too easy or too difficult does not add to learning (see Figure 2.4). Also, according to a Vygotskian approach to instruction, teaching must emphasize scaffolding, with students taking more and more responsibility for their own learning (Berger, 2012; Daniels et al., 2007; Ostroff, 2012). Finally, students can benefit from cooperative learning arrangements among groups of learners with differing levels of ability. Tutoring by more
Competent peers can be effective in promoting growth within the zone of proximal development, as can interactions around complex tasks (Roth & Lee, 2007).

You can use information about Vygotsky’s zone of proximal development in organizing classroom activities in the following ways:

- Instruction can be planned to provide practice within the zone of proximal development for individual children or for groups of children. For example, hints and prompts that helped children during a preassessment could form the basis of instructional activities.
- Scaffolding (John-Steiner & Mahn, 2003) provides hints and prompts at different levels. In scaffolding, the adult does not simplify the task, but the role of the learner is simplified “through the graduated intervention of the teacher.”
- Cooperative learning activities can be planned with groups of children at different levels who can help each other learn (Slavin, 2011; Webb, 2008).

Scaffolding directly relates to the concept of a zone of proximal development. For example, a child might be shown pennies to represent each sound in a word (e.g., three pennies for the three sounds in “man”). To master this word, the child might be asked to place a penny on the table to show each sound in a word, and finally the child might identify the sounds without the pennies. When the adult provides the child with pennies, the adult provides a scaffold to help the child move from assisted to unassisted success at the task (Rogoff, 2003). In a high school laboratory science class, a teacher might provide scaffolding by first giving students detailed guides to carrying out experiments, then giving them brief outlines that they might use to structure experiments, and finally asking them to set up experiments entirely on their own.

**FIGURE 2.4  Teaching Model Based on Vygotsky’s Theory**

In (a), the child performs a learned task; in (b), the child is assisted by a teacher or peer who interacts with the child to help him move into a new zone of proximal development (unlearned tasks at limits of learner’s abilities) with a new learned task.
HOW DID BRONFENBRENNER VIEW DEVELOPMENT?

Urie Bronfenbrenner, a psychologist who was born in Russia but came as a child to the United States, described a “bioecological” model of human development (Bronfenbrenner & Morris, 2006). His model is summarized in Figure 2.5. The focus of his model is on the social and institutional influences on a child’s development, from family, schools, churches, and neighborhoods to broader social and political influences, such as mass media and government.

Bronfenbrenner’s main contribution was in showing how development is influenced at each of the levels. Bronfenbrenner critiques the Piagetian view for its limited focus beyond the child. He notes the enormous influence of the home and family (the microsystem) and the mutual influences between the child and the family. The mesosystem binds children to parents, students to teachers, and friends to friends. The exosystem (e.g., community, local government, church) affects development directly and through its influence on families, and the macrosystem, including cultural and religious values as well as mass media, sets an important context for all of development. Finally, the chronosystem refers to how the passage of time and immediate historical events change all of the factors surrounding the child. Bronfenbrenner emphasizes that all of these factors are constantly changing, and that the child him- or herself has an influence on many of them, especially the family.

The importance of the bioecological approach is in emphasizing the interconnectedness of the many factors that influence a child’s development. A change in the family, such as a divorce or loss of a job, not only influences the child directly, but may also cause changes in the child’s neighborhood, school, church, and friends. The bioecological approach is descriptive and philosophical, and does not have the extensive research support devoted to Piaget’s or Vygotsky’s
perspectives. However, it builds out from Vygotsky’s emphasis on sociocultural factors a more complete model of influences beyond biology on child development.

HOW DO LANGUAGE AND LITERACY DEVELOP?

The aspects of development arguably of greatest concern to educators are language and literacy. Children who develop large vocabularies and become effective speakers, readers, and writers are likely to be successful in school and beyond. Development of language and literacy is a key objective of teaching, but there are also characteristic patterns of development over time seen in all cultures that are not the direct results of teaching.

**Language and Literacy Development during the Preschool Years**

Although there are individual differences in the rates at which children acquire language abilities, the sequence of accomplishments is similar for all children. Around age 1, children produce one-word utterances such as “bye-bye” and “Mommy.” These words typically represent objects and events that are important to the child. Over the course of the second year of life, children begin to combine words into two-word sentences (e.g., “More milk”). During the preschool years, children’s vocabulary increases, along with their knowledge of the rules of spoken language. By the time they start school, children have mastered most of the grammatical rules of language, and their vocabulary consists of thousands of words.

**ORAL LANGUAGE** Development of oral language, or spoken language, requires not only learning words but also learning the rules of word and sentence construction (Gleason & Ratner, 2009; Hoff, 2003). For example, children learn the rules for how to form plurals before they enter kindergarten. Berko (1985) showed preschoolers a picture of a made-up bird, called a “Wug.” She then showed them two such pictures and said, “Now there is another one. There are two of them. There are two ______.” The children readily answered “Wugs,” showing that they could apply general rules for forming plurals to a new situation. In a similar fashion, children learn to add -ed and -ing to verbs.

Interestingly, children often learn the correct forms of irregular verbs (such as “He broke the chair”) and later replace them with incorrect but more rule-based constructions (“He breaked [or broked] the chair”). One 4-year-old said, “I flew my kite.” He then thought for a moment and emphatically corrected himself, saying, “I flewed my kite!” These errors are a normal part of language development and should not be corrected.

Just as they learn rules for forming words, children learn rules for sentences. Their first sentences usually contain only two words (“Want milk,” “See birdie,” “Jessie outside”), but they soon learn to form more complex sentences and to vary their tone of voice to indicate questions (“Where doggie go?”) or to indicate emphasis (“Want cookie!”). Three-year-olds can usually express rather complex thoughts, even though their sentences may still lack such words as a, the, and did.

Preschoolers often play with language or experiment with its patterns and rules. This experimentation frequently involves changing sounds, patterns, and meanings. One 3-year-old was told by his exasperated parent, “You’re impossible!” He replied, “No, I’m impopsicle!” The same child said that his baby brother, Benjamin, was a man because he was a “Benja-man.” Children often rearrange word sounds to create new words, rhymes, and funny sentences. The popularity of finger plays, nonsense rhymes, and Dr. Seuss storybooks shows how young children enjoy playing with language.

Oral language development is heavily influenced by the amount and quality of talking parents do with their children. A classic study by Hart and Risley (1995) found that middle-class parents talked far more to their children than did working-class parents, and that their children had substantially different numbers of words in their vocabularies. The amount of parent speech was as important as socioeconomic status; children of low-income parents who spoke to their children a great deal also had large vocabularies.

**READING** Learning to read in the early elementary grades is one of the most important of all developmental tasks, both because other subjects depend on reading and because in our society school success is so often equated with reading success. Children often have complex language skills that are critical in reading, and the process of learning to read can begin quite early if children are read to (Giorgis & Glazer, 2009). Research on emergent literacy, or preschoolers’ knowledge and skills related to reading (Byrnes, 2008; Morrow, 2009; National Institute for Literacy, 2008), has shown
that children may enter school with a great deal of knowledge about reading and that this knowledge contributes to success in formal reading instruction. For example, young children have often learned concepts of print such as that print is arranged from left to right, that spaces between words have meaning, and that books are read from front to back. Many preschoolers can “read” books from beginning to end by interpreting the pictures on each page. They understand about story plots and can often predict what will happen next in a simple story. They can recognize logos on familiar stores and products; for example, very young children often know that M is for McDonald’s. Children who are read to and taught letters at home start off with an advantage in reading (Hood, Conlon, & Andrews, 2008), but all children can learn concepts of print, plot, and other prereading concepts if they attend preschools or kindergartens that emphasize reading and discussing books in class (Chambers, deBotton, Cheung, & Slavin, 2012; National Institute for Literacy, 2008). Similarly, young children can be taught to hear specific sounds within words (a skill called phonemic awareness), which contributes to later success in reading (Anthony & Lonigan, 2004; Byrne, Fielding-Barnsley, & Ashley, 2000; Cavanaugh, Kim, Wanzek, & Vaughn, 2004; National Institute for Literacy, 2008).

Learning Differences

IntASC 2

Learning Differences

Promoting Literacy Development in Young Children

Many of the educational implications derived from research on children’s literacy development transfer findings from two sources: parental and teacher behaviors that encourage oral language development and studies of young children who learn to read without formal classroom instruction. The most frequent recommendations include reading to children; surrounding them with books and other printed materials; making various writing materials available; encouraging reading and writing; and being responsive to children’s questions about letters, words, and spellings (Florez, 2008; Hood et al., 2008; Morrow, 2009; National Institute for Literacy, 2008; Rust, 2008).

You can use numerous props in the classroom, such as telephone books and office space in a dramatic play area. Classrooms can have writing centers with materials such as computers with writing programs, magnetic letters, chalkboards, pencils, crayons, markers, and paper.

You can encourage children’s involvement with print by reading in small groups, having volunteers read to children individually, and allowing children to choose books to read. Intimate reading experiences allow children to turn pages, pause to look at pictures or ask questions, and read along with an adult.

Predictable books such as *The Three Little Pigs* and *There Was an Old Lady Who Swallowed a Fly* allow beginning readers to rely on what they already know about literacy while learning sound–letter relationships. Stories are predictable if a child can remember what the author is going to say and how it will be stated. Repetitive structures, rhyme and rhythm, and a match between pictures and text increase predictability.

Children’s understanding of literacy is enhanced when adults point out the important features of print. Statements such as “We must start at the front, not at the back of the book”; “Move your finger; you’re covering the words and I can’t see to read them”; and “You have to point to each word as you say it, not to each letter, like this” help to clarify the reading process. You can indicate features in print that are significant and draw attention to patterns of letters, sounds, or phrases.

The preschool child in this video has very clear ideas about literacy already. What types of activities would you expect that she and her family engage in regularly?
Children’s writing also follows a developmental sequence (McCarthey, 2008; Morrow, 2009). It emerges out of early scribbles and at first is spread randomly across a page. This characteristic reflects an incomplete understanding of word boundaries as well as an inability to mentally create a line for placing letters. Children invent spellings by making judgments about sounds and by relating the sounds they hear to the letters they know. In trying to represent what they hear, they typically use letter names rather than letter sounds; short vowels are frequently left out because they are not directly associated with letter names (Morrow, 2009). For example, one kindergartner labeled a picture of a dinosaur “DNSR.”

**Language and Literacy Development during the Elementary and Secondary Years**

Language and literacy develop at a rapid rate for children in the elementary and secondary grades. For example, Graves (2007) estimates that the average student adds 3,000 words each year to his or her vocabulary. However, these words will vary, as a student’s motivations, interest, culture, and peer group come to have a huge impact. For example, a girl who talks sports with her friends and family, plays sports, reads about sports, and watches sports on television builds up an enormous sports vocabulary. A girl who loves science and is in a family and peer group who talk about science builds up an equally enormous science vocabulary. But which of these—sports or science—will be on the SAT? Obviously, the science girl is at a great advantage in school because of her interests and social context.

Literacy also develops rapidly in the elementary and middle grades. Whereas the emphasis in the early elementary grades is primarily on decoding and fluency, students from second grade onward are increasingly focused on building comprehension, vocabulary, and study skills (Deshler, Palincsar, Biancarosa, & Nair, 2007; Kamil, Borman, Dole, Kral, & Salinger, 2008). Good readers use strategies such as predicting, reviewing, summarizing, and generating their own questions, and if these strategies are directly taught to elementary and secondary students, their comprehension improves (Biancarosa & Snow, 2006; Block & Duffy, 2008; Gersten, Chard, Jayanthi, & Baker, 2006).

**THEORY INTO PRACTICE**

**Building Vocabulary in Elementary and Secondary Schools**

Students in elementary and secondary schools are already learning a vast amount of vocabulary every year. Your task is to help them learn the specific vocabulary most likely to be useful in school and society.

Research on strategies for increasing vocabulary finds that vocabulary building should be a focus throughout the school day. An intentional teacher both creates opportunities to highlight vocabulary and takes advantage of opportunities as they arise, as in the following commonsense principles with a basis in research (also see Goodson et al., 2011; Graves, August, & Carlo, 2011; Marzano, 2009):

- Get students excited about words. Motivation is the key to vocabulary (Guthrie & Wigfield, 2000; Pintrich, 2003).
- Encourage students to read, especially on topics that interest them. Broad, motivated reading contributes a great deal to vocabulary (Graves, 2007).
- Teach selected words that are both frequently used and broadly useful (Beck, Mckeown, & Kucan, 2002; Biemiller, 2011; Blachowicz et al., 2006).
- Give students many opportunities to use new vocabulary words in their own sentences in writing, in conversations, or in other forms that give them opportunities to put them in their own language (Biemiller, 2004; Duke et al., 2003; Headley, 2008).
- Use cooperative learning methods in which students have regular opportunities to study together and use new vocabulary words (Slavin, 2011; Webb, 2008).
Chapter Two

THE INTENTIONAL TEACHER
Teaching in Light of Principles of Cognitive, Language, and Literacy Development

Intentional teachers use what they know about predictable patterns of cognitive, literacy, and language development to make instructional decisions.

- They are aware of what children of the age they teach are able to do now and of the next steps in their development, and help give their students opportunities to grow into new ways of thinking.
- They assess their children’s thinking processes, using observation as well as formal measures, to understand their cognitive levels and barriers to their growth.
- They modify their instruction if they find either that it is not challenging their students to make conceptual growth or if they find that many students are struggling due to developmental unreadiness.
- They give students many opportunities to work with diverse peers so that they can regularly experience how peers at slightly different cognitive levels proceed to solve problems.
- They give students many opportunities to solve complex, practical problems that force them to encounter cognitive issues appropriate to their developmental levels, such as puzzling science experiments and intriguing math problems.
- They take into account cultural, family, and community factors in their teaching without using these factors as excuses to demand less of certain students.
- They proactively invite parents and community members to be involved with their teaching, so that students can see a consistency of expectations between school, home, and community and so that families and community members can better reinforce the school’s goals for the children they share.

In the Pearson etext, watch a classroom video. Then use the guidelines in the “Intentional Teacher” to answer a set of questions that will help you reflect on and understand the teaching and learning presented in the video.

SUMMARY

How Do Children Develop Cognitively?
Most developmental psychologists believe nature and nurture combine to influence cognitive development. Continuous theories of development focus on social experiences that a child goes through, whereas discontinuous theories emphasize inborn factors rather than environmental influence.

How Did Piaget View Cognitive Development?
Piaget postulated four stages of cognitive development through which people progress between birth and young adulthood. People adjust their schemes for dealing with the world through assimilation and accommodation. Piaget’s developmental stages include the sensorimotor stage (birth to 2 years of age), the preoperational stage (2 to 7 years of age), and the concrete operational stage (ages 7 to 11). During the formal operational stage (age 11 to adulthood), young people develop the ability to deal with hypothetical situations and to monitor their own thinking.

How Is Piaget’s Work Viewed Today?
Piaget’s theory has been criticized for relying exclusively on broad, fixed, sequential stages through which all children progress and for underestimating children’s abilities. In contrast, neo-Piagetian
theories place greater emphasis on social and environmental influences on cognitive development. Never-
theless, Piaget's theory has important implications for education. Piagetian principles are embedded
in the curriculum and in effective teaching practices, and Piaget-influenced concepts such as cognitive
constructivism and developmentally appropriate instruction have been important in education reform.

How Did Vygotsky View Cognitive Development?

Vygotsky viewed cognitive development as an outgrowth of social development through interac-
tion with others and the environment. Mediated learning takes place in children's zones of proximal
development, where they can do new tasks that are within their capabilities only with a teacher's or
peer's assistance. Children internalize learning, develop self-regulation, and solve problems through
vocal or silent private speech. Teachers provide interactional contexts, such as cooperative learning,
mediation, and scaffolding, to help children build understanding of developmentally appropriate skills.

How Did Bronfenbrenner View Development?

Bronfenbrenner created a bioecological model to describe how family, school, community, and
cultural factors impact a child's development.

How Do Language and Literacy Develop?

During the Preschool Years

Young children's language develops in predictable patterns as children use and play with language. Early
literacy developments depend on children's experiences at home and their learning about books
and letters.

During the Elementary and Secondary Years

Students make rapid progress in vocabulary and reading comprehension. Motivation is a key to
both, as are opportunities to use new words and reading skills with peers and in new forms.

KEY TERMS

Review the following key terms from the chapter.

- accommodation 32
- adaptation 31
- assimilation 31
- bioecological approach 42
- centration 33
- cognitive development 30
- concrete operational stage 34
- conservation 33
- constructivism 32
- continuous theories of
  development 30
devolution 29
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- egocentric 33
- emergent literacy 43
- equilibration 32
- formal operational stage 35
- inferred reality 34
- mediation 39
- object permanence 33
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- private speech 39
- reflexes 32
- reversibility 33
- scaffolding 40
- schemes 31
- self-regulation 39
- sensorimotor stage 32
- seriation 34
- sign systems 39
- transitivity 35
- zone of proximal
  development 39

SELF-ASSESSMENT:
PRACTICING FOR LICENSURE

Directions: This chapter addresses indicators that are often assessed in state licensure exams. Respond
to the following questions.

1. According to Piaget, why do preoperational children think a cut-up sandwich is more sand-
wich than a whole one?
2. According to Vygotsky, why does cooperative work help children to learn?
3. According to Bronfenbrenner, how might a parents' divorce change a child's cognitive development?
4. Write a brief description of a typical student at one of the following grade levels: K–1, 2–5,
6–8, 9–12. Use the ideas of each theorist from this chapter to guide your description.
5. Make a list of developmentally appropriate teaching strategies for one of the following grade
levels: K–1, 2–5, 6–8, 9–12.

Answer questions and receive instant feedback in your Pearson etext.