Using EDUCATIONAL PSYCHOLOGY in Teaching

ELEVENTH EDITION

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Preface

Welcome to the eleventh edition of our text. As in all fields, educational psychology rapidly advances, and our goal in this edition is to capitalize on these advances to produce a book that meets three goals: to provide the most conceptually sound theory possible, to include up-to-date research, and to prepare a text that provides the most concrete and specific suggestions in the field for applying the content of Educational Psychology in PreK–12 classrooms. Upon the advice of Kevin Davis, our editor, to reflect the third goal and symbolize an essential thrust of our text, we have changed its name to *Using Educational Psychology in Teaching*. Many students can describe and explain the topics included in an educational psychology text, but far fewer know how, as teachers, to apply these topics to increase their students' learning.

The Most Applied Text in the Field

Applications in Classrooms

We attempt to reach our third goal above in several ways. First, we introduce each chapter with a case study in which a teacher is applying the content of the chapter to increase student learning and development.

We then integrate the case studies throughout the chapters in attempts to make the content of each meaningful for readers and further illustrate how educational psychology can be used in teaching to increase student learning.

We expand on this process by including one or more sections in each chapter titled "Using Educational Psychology in Teaching: Suggestions for Applying . . . with Your Students." In these sections we include specific suggestions for applying, for instance, Vygotsky's theory of cognitive development, social-emotional learning, culturally responsive teaching, universal design for learning, social constructivist views of learning, theories of motivation, formative assessment, and so on, in classrooms. We then illustrate each of these suggestions with concrete examples taken from the real world of PreK–12 teaching. As a further illustration, the video episodes on which the case studies integrated throughout chapters 2, 9, 11, 13, and 14 are based are included with the MyLab Education component that accompanies this text. These episodes show the actual classroom lessons and provide students with authentic, real-world insights into learning and teaching, and they will hopefully make the written case studies and chapter content more meaningful for readers.

In addition to these specific suggestions we include *Classroom Connections,* which provide additional suggestions for applying the content of each section at the elementary, middle school, and high school levels, and we include *Developmentally Appropriate Practice* sections in each chapter that offer suggestions for adapting the content for different developmental levels.

Also, in each chapter we include two, three, or four Application Exercises, placed throughout the chapter, that ask readers to apply the chapter content to the real world of teaching. A total of 47 exercises are included in the book's 15 chapters, 38 of which are based on video episodes of approximately five minutes or less, leaving 9 that are based on written case studies. Feedback for all the Application Exercises is included.

In the eText we include Video Examples, ranging from approximately 40 seconds to 2 minutes in length, that provide brief, concrete illustrations of the chapter content. The Video Examples are placed next to the topics they illustrate.

Finally, at the end of each major section of every chapter, we include Self-Check Practice and Quiz-Me exercises designed to help readers acquire a deep understanding of the content in the chapters. The exercises are all written at higher cognitive levels, they focus on classroom application, and readers can respond to the practice exercises as often as they want. Feedback is provided for all the exercises.

As authors, we continue to spend a great deal of time in PreK–12 classrooms, working directly with teachers and students, and we believe this experience helps us provide the most realistically applied textbook in educational psychology. If you want a book that is truly applied, we believe this is the book for you.

Applications in Today's World

In addition to our attempts to help readers apply the content of educational psychology in their teaching, we also provide short sections throughout the text titled *Ed Psych and You,* which ask one or more questions about personal experiences that can be explained with topics in educational psychology. For instance, we ask questions such as:

Are you bothered when something doesn't make sense? Are you more comfortable in classes where the instructor specifies the requirements, outlines the grading practices, and consistently follows through? "Yes" is the answer for most people. Why do you think this is the case?

Theories of cognitive development help answer this question.

Think about some of your friends and acquaintances. Are those who seem happiest and have the greatest sense of well-being also the most intelligent or academically successful? If not, why do you think that's the case?

These questions can be answered with research examining social-emotional development.

Do you like to play games? Do you like playing all games or only certain ones? Why do you enjoy some and not others? Is succeeding in some games more important to you than succeeding in others?

We can answer these questions with theories of motivation.

We discuss and explain questions such as these in each chapter. This feature is our attempt to remind readers that educational psychology, in addition to providing essential applications in PreK–12 classrooms, can be applied in our daily lives. It is one of the most attractive aspects of the field.

Conceptually Sound Theory and Up-to-Date Research

Educational psychology has enormous implications for the way we teach and help students learn. To capitalize on these implications and reach the first two goals we identified at the beginning of the preface, we are including much new and updated content. We outline it below.

In Every Chapter

Top 20 Principles from Psychology—The American Psychological Association has identified 20 principles that are particularly applicable for PreK–12 teaching and learning. We describe the principles in Chapter 1; at the beginning of each chapter we identify the principles that are particularly emphasized in that chapter, and we specify the location in the chapter where the principle is applied with a callout.

The National Council on Teacher Quality (NCTQ)—The NCTQ has identified six essential teaching strategies that all new teachers need to know. As with the top 20 principles from psychology, we discuss the strategies in Chapter 1, identify those that are particularly emphasized at the beginning of each chapter, embed examples of their applications in the chapters, and identify the example with a callout.

Diversity

Diversity and immigration—Our students are the most diverse in the history of our nation, and immigrant students are making up an increasing proportion of school populations. We devote Chapter 4 to the topic and we include sections in each of the other chapters that examine the implications of diversity for our work with students. Unlike some representatives of today's political world, we sincerely believe that diversity enriches us all, and we express this optimistic view throughout the text.

The theoretical framework for culturally responsive teaching—Research indicates that "Culturally Responsive Teaching" can increase achievement for all students and particularly members of cultural minorities. We significantly expand our discussion of culturally responsive teaching in Chapter 4 of this edition, and we include new content that offers a theoretical framework that supports the practice.

Discriminatory classroom management policies—Research consistently indicates that racial disparities exist in teachers' classroom management practices. We examine this research in detail in Chapter 12 and offer specific suggestions for developing equitable classroom management policies.

Are members of cultural minorities over- or underrepresented in special education? Research indicates that, in contrast with popular beliefs, members of cultural minorities are underrepresented in special education, which deprives them of services that can help them succeed and thrive. We examine this issue in detail in Chapter 5.

Learning, Development, and Motivation

Critical thinking and the Internet—Critical thinking has become a major issue in today's world of "conspiracy theories," "post truth," and "fake news." Research indicates that today's students have difficulty separating fake news from real news and conspiracy theories from facts. In our discussion of critical thinking in Chapter 8, we examine these issues in detail, and we offer suggestions for what we, as teachers, can do to help students develop the critical thinking abilities that will help them deal effectively with these issues.

Technology, learning, and development—Technology is ubiquitous, and the impact of technology/social media/smartphones on learning and development is widely discussed in the research literature. We provide detailed discussions of both the positive and negative influences of technology on learning and development, and particularly social-emotional development, throughout the text.

The cognitive neuroscience of learning and development—Neuroscience is expanding our understanding of learning and development, and this understanding has important implications for our teaching. We examine these implications in detail, and provide

suggestions for what we, as teachers, can do to capitalize on our increasing understanding of neuroscience to improve learning for all students.

Executive functioning—Executive functioning is essential for both learning and daily living. It is so important that strategies for measuring it are included on tests of intelligence and school readiness. We include a detailed description of this important process in our discussion of cognitive views of learning in Chapter 7, and we offer suggestions teachers can use to help students develop their executive functioning abilities.

Universal design for learning (UDL)—UDL designs instructional materials and activities to make content accessible to all learners. UDL is the process designed to ensure that inclusion is successful for learners with exceptionalities. We examine UDL in detail in our discussion of learners with exceptionalities in Chapter 5.

Should students be taught to code?—A move to teach middle and high school students to *code*—learn to use the language programmers employ to design apps, websites, and software—is now sweeping through our nation's schools. The goal is to, in the language of Timothy Cook, CEO of Apple, help solve a "huge deficit in the skills that we need today." This initiative is controversial. We examine the initiative, its implications for learning and teaching, and the controversies involved in Chapter 8.

Grit: Sustained commitment to achieving long-term goals—Grit is an essential motivation concept associated with growth mindsets, mastery goals, high levels of perseverance, delay of gratification, and an absence of pleasure seeking. It has come into widespread prominence as the result of work by psychologist Angela Duckworth. We significantly expand our discussion of this important concept in our study of motivation, and we offer suggestions for developing "grit" in students.

Social-Emotional Learning and Development

Social-emotional development—Social-emotional development is receiving a great deal of research attention, and some experts believe it's even more important than cognitive development. We devote a major section to this topic in our discussion of personal, social, and moral development in Chapter 3, and we refer to the topic at various locations throughout the chapters.

LGBTQ students—Research consistently indicates that LGBTQ students have a myriad of problems in both school and life outside of school. And their issues have been exacerbated by the political controversies surrounding transgender youth. We examine the issues involved and what teachers can do to promote the social-emotional development of these young people and help them overcome the many challenges they now face.

School shootings—In the wake of an increase in school shootings and particularly the massacre at Marjory Stoneman Douglas high school in Parkland, Florida, teachers and students across our country have been traumatized, and the trauma is impacting teaching, learning, and students' social-emotional development. We examine the issue, its implications for learning and teaching, and the political controversies surrounding the idea that teachers be armed.

Sexual assault and sexual harassment in schools—Sexual harassment has a long history, but the "Me Too" movement, which gained prominence in late 2017, gave it widespread publicity. Sexual harassment and sexual assault are more common than would be expected in schools. We discuss this issue and what can be done to prevent both in our discussion of gender and gender issues in Chapter 4.

The opioid crisis—The opioid crisis is ravaging our country, it's impacting our schools, and it has important implications for teachers and schools. We examine this topic in detail together with the implications it has for learning, teaching, and social-emotional development.

Instruction and Assessment

Backward design—Backward design is a prominent approach to planning for instruction. We use this conceptual framework in our discussion of instructional planning in Chapter 13 and classroom assessment in Chapter 14, and we offer specific suggestions for ways teachers can capitalize on this planning approach to increase learning in their students.

Case studies linked to standards—Learning standards are now a part of teachers' lives, and many new teachers are uncertain about how to plan and implement instruction designed to help students meet the standards. In a further commitment to our emphasis on application, we link many of our case studies throughout the text to standards, and we provide a detailed discussion of instruction grounded in standards.

Data-driven instruction—Data-driven instruction is a teaching approach that relies on information about student performance to inform teaching and learning. It emphasizes clear objectives, baseline data, frequent assessment, and instruction grounded in assessment data. We examine data-driven instruction in our discussion of assessment in Chapter 14.

Personalized learning—Personalized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner**.** Commonly linked to technology, this approach to learning has both strong proponents and equally strong critics. The approach has important implications for teaching, and we examine both the implications and the controversies in our discussion of instruction in Chapter 13.

Formative assessment—Formative assessment is the process of gathering information about student learning with the goal of informing next steps in teaching. It is one of the most powerful learning tools we have. We significantly expand the discussion of this process and its counterpart, summative assessment, in our discussion of classroom assessment in Chapter 14.

ESSA—The Every Student Succeeds Act (ESSA) is the most recent federal effort to improve education in our country. Accountability remains its central component, but the definition of achievement goes beyond standardized test results to include other measures of student learning, such as motivation and self-regulation. We describe the act in our discussion of standardized testing in Chapter 15, together with its implications for teaching and learning in our nation's schools.

The backlash against high-stakes testing—High-stakes testing and particularly value-added modeling are highly controversial. We discuss these controversies, and the implications they have for teaching and learning, in detail in our examination of standardized testing in Chapter 15.

edTPa—edTPa (Educational Teacher Performance Assessment) is a high-stakes preservice assessment process designed to answer the question, "Is a new teacher ready for the job?" As its use becomes more widespread, it will have increasingly important implications for teacher preparation. We examine this assessment process in our discussion of accountability in Chapter 15.

This new content adds to our detailed descriptions of traditional theories combined with the latest research. Our goal is to make the content in this text as comprehensive and up-to-date as any in the field. Combined with our emphasis on application, we believe this is a text that can help prepare teachers who are truly professionals.

MyLab Education

One of the most visible changes in the eleventh edition, and also one of the most significant, is the expansion of the digital learning and assessment resources embedded in the eText and the inclusion of MyLab Education in the text. MyLab Education is an

online homework, tutorial, and assessment program designed to work with the text to engage learners and to improve learning. Within its structured environment, learners see key concepts demonstrated through real classroom video footage, practice what they learn, test their understanding, and receive feedback to guide their learning and to ensure their mastery of key learning outcomes. Designed to bring learners more directly into the world of K–12 classrooms and to help them see the real and powerful impact of educational psychology concepts covered in this book, the online resources in MyLab Education with the Enhanced eText include:

- Video Examples. About 3 or 4 times per chapter, an embedded video provides an illustration of an educational psychology principle or concept in action. These video examples most often show students and teachers working in classrooms. Sometimes they show students or teachers describing their thinking or experiences.
- Self-Checks. In each chapter, self-check quizzes help assess how well learners have mastered the content. The self-checks are made up of self-grading, multiple-choice items that not only provide feedback on whether questions are answered correctly or incorrectly, but also provide rationales for both correct and incorrect answers.
- Application Exercises. These exercises give learners opportunities to practice applying the content and strategies from the chapters. The questions in these exercises are usually constructed-response. Once learners provide their own answers to the questions, they receive feedback in the form of model answers written by experts.

Supplementary Materials

This edition of *Using Educational Psychology in Teaching* provides a comprehensive and integrated collection of supplements to assist students and professors in maximizing learning and instruction. The following resources are available for instructors to download from www.pearsonhighered.com/educator. Enter the author, title of the text, or the ISBN number, then select this text, and click on the "Resources" tab. Download the supplement you need. If you require assistance in downloading any resources, contact your Pearson representative.

Instructor's Resource Manual

The Instructor's Resource Manual includes chapter overviews and outcomes, lists of available PowerPoint® slides, presentation outlines, teaching suggestions for each chapter, and questions for discussion and analysis along with feedback.

PowerPoint® Slides

The PowerPoint® slides highlight key concepts and summarize text content. The slides also include questions and problems designed to stimulate discussion, encourage students to elaborate and deepen their understanding of the topics in each chapter, and apply the content of the chapter to both the real world of teaching and their daily lives. The slides are further designed to help instructors structure the content of each chapter to make it as meaningful as possible for students.

Test Bank

The Test Bank provides a comprehensive and flexible assessment package. The Test Bank for this edition has been revised and expanded to make it more applicable to students. To provide complete coverage of the content in each chapter, all multiple-choice and essay items are grouped under the chapters' main headings and are balanced between knowledge/recall items and those that require analysis and application.

TestGen®

TestGen 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 may be created for both print and 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)
D2L Test Bank (zip)
Moodle Test Bank
Sakai Test Bank (zip)

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Our appreciation goes to all of these fine people who have taken our words and given them shape. We hope that all of our efforts will result in increased learning for students and more rewarding teaching for instructors.

Finally, we would sincerely appreciate any comments or questions about anything that appears in the book or any of its supplements. Please feel free to contact either of us at any time. Our e-mail addresses are: peggen@unf.edu and don.kauchak@gmail.com.

Good luck and best wishes.

Paul Eggen

Don Kauchak

Chapter 1

Educational Psychology: Understanding Learning and Teaching

Digital Vision/Getty Images

Learning Outcomes

After you've completed your study of this chapter you should be able to:

1.1 Describe expert teaching and explain how expert teaching influences student learning.

1.2 Describe the types of professional knowledge that expert teachers possess.

1.3 Describe different types of research and explain how research contributes to teachers' professional knowledge.

1.4 Identify factors that influence teaching in today's classrooms.

You've just opened your book, and you're probably wondering what this class will be like and how it will make you a better teacher. To introduce you to the content of this text, we begin by looking at three brief classroom lessons—one from elementary, another from middle school, and a third from high school—taken from the real world of teaching.

Sophia Perez, a first-grade teacher, is working with her 18 students to help meet the following standard:

> **Use singular and plural nouns with matching verbs in basic sentences (e.g., He hops; We hop). (Common Core State Standards Initiative, 2018a).**

She has the children sitting on a carpet at the front of the room as she displays the following on her document camera:

> **Owen runs around the corner to find his ball. Olivia and Emma run after him. After getting his ball, he walks back to where they are playing. They walk back right behind him.**

She has the students read the short paragraph aloud in unison and then points to the underlined portions. "What is the difference between these two?" she asks, pointing at *Owen runs* and then *Olivia and Emma run.*

With guidance from Sophia, the students conclude that *Owen* refers to one person, and *Olivia and Emma* refer to two people, and *runs* is used with one person, and *run* is used with two people. She does the same with *he walks* and *they walk*.

She then displays the following sentence:

> **Kelly skips rope, and sometimes we skip together.**

She continues by asking, "Now, why did we use 'skips' here, but 'skip' here?" She points to the sentence in each case, and she guides the students to conclude that "skips" was used because Kelly was one person, whereas "skip" was used because "we" represents more than one person.

For practice, she then gives the students three additional sentences and has them determine if the sentences are written correctly.

Now, let's look at Keith Jackson, a middle school math teacher.

Keith is working with his 26 students on decimals and percents, to help meet the following standard.

> **Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent (Common Core State Standards Initiative, 2018b).**

He begins the lesson by showing his class a 12-ounce soft drink can from a machine, a 20-ounce bottle, and a six-pack with price tags on them.

To help his students meet the standard, he organizes them in pairs and assigns the task of using their understanding of decimals and percents to determine which is the best buy.

As the students work, Keith moves around the room, asking questions and guiding their efforts, and when the groups conclude that the six-pack is the best buy, he asks, "So, how do you know?"

"The cost per ounce is the lowest for them," Savannah responds, pointing to the six-pack.

Now, let's turn to Kelsey Walsh, a high school social studies teacher with 32 students in her class.

Kelsey is beginning a unit on assessing conclusions with evidence as she focuses on the following standard:

> **Assess the extent to which the reasoning and evidence in a text support the author's claims (Common Core State Standards Initiative, 2018c).**

"Our goal," Kelsey begins, pointing to the standard, "is to be able to determine how well writers and speakers support the claims they make with evidence. This will help us learn to think critically about what we hear and read, and ultimately, it will make us more informed citizens and will help us avoid problems on the Internet, such as fake news or getting scammed."

She then displays the following for the students:

> **Because our broadcasting companies are for-profit organizations dependent on advertisers, their news broadcasts are superficial and meaningless. For instance, the NBC nightly news, scheduled for a half hour, only has, on average, about 20 minutes of actual news, with the rest advertising. The total broadcast is only 28 minutes long. A recent newscast covered four major topics, the last three of which took a total of about 7 minutes.**

"Now," Kelsey continues after giving the students time to read the display, "what's the author's claim here?"

With her guidance, they decide that the author is claiming that news broadcasts are shallow and superficial and perhaps even meaningless.

Kelsey then asks them what the author provides as evidence supporting the claim, and the students note that the author provides the number of minutes of actual news and the number of topics in a typical half-hour newscast.

After additional discussion, the class agrees that newscasts are at least somewhat superficial.

"But, I don't think the author supported his assertion that the telecasts are meaningless . . . superficial maybe, but not meaningless," Olivia asserts toward the end of the discussion.

"Why do you say that?" Kelsey probes.

The class continues the discussion, debating whether newscasts are actually meaningless.

Helping students learn and develop is the goal of all teaching, so consider the following question. In each of the examples above, which of the following factors had the most impact on students' learning?

- *Curriculum and the available materials*—the content students study, such as subject–verb agreement in Sophia's case, decimals and percents in Keith's, and claims and evidence in Kelsey's, together with the examples that each teacher used.
- *Standards*—statements describing what students should know or be able to do at the end of a period of study. Each teacher's lesson focused directly on a standard.
- *Class size*—Sophia has 18 students in her class, Keith has 26, and Kelsey has 32.
- *The teacher*—Sophia, Keith, and Kelsey.

While each of the factors, as well as others, such as adequate facilities and leadership—the principal and other school leaders—will influence students' learning, the unequivocal answer to our question is: the TEACHER! The quality of teachers is, without question, the most important factor influencing our students' learning (Araujo, Carneiro, Cruz-Aguayo, & Shady, 2016; Chetty, Friedman, & Rockoff, 2014; Houkes-Hommes, ter Weel, & van der Wiel, 2016).

Expert Teaching and Student Learning

1.1 Describe expert teaching and explain how expert teaching influences student learning.

Interestingly, the importance of teachers hasn't always been obvious to educational leaders and policy makers. In efforts to improve schooling, reformers have tried a number of strategies, including different organizational structures, such as open classrooms, a variety of curricular and instructional approaches, such as Whole Language and what was commonly called "New Math," and more recently, the infusion of support systems, such as technology. However, none of them proved to be the hoped-for panacea (Kunter et al., 2013).

The key to increasing student learning is simple, but admittedly not easy. Find and prepare the highest quality teachers possible. No organization, system, or enterprise is any better than the people in it, and the same applies to schools. Research consistently confirms that expert teaching is the primary factor influencing student achievement (Araujo et al., 2016; Kunter et al., 2013). Additional research suggests that the quality of a school is determined by the quality of its teachers (Goldhaber, 2016), and a compelling review of research found that students taught by expert teachers are more likely to attend college and earn higher salaries, and are less likely to have children as teenagers (Chetty et al., 2014).

Similar results have been found in educational systems around the world, suggesting that the success of a nation depends on the development of its **human capital**, people's professional knowledge and skills, social abilities, and personality attributes that contribute to a nation's cultural and economic advancement. "Advances in discovering the most important inputs of the human-capital production function have led to the conclusion that teacher quality is crucial for building a country's human-capital stock" (Houkes-Hommes et al., 2016, p. 358).

Some people, including many educational leaders, once believed that expert teaching is essentially instinctive, a kind of magic performed by born superstars. And, as is the case with other domains, such as athletics, music, or art, some teachers do indeed have more natural ability than others. However, research dating back to the 1960s and 1970s indicates that expert teachers possess knowledge and skills that are not purely instinctive. Rather, they are acquired through study and practice (Fisher et al., 1980), and more recent work corroborates these earlier findings (Kunter et al., 2013; Lemov, 2015). This is true in all domains. For example, many athletes, through hard work and training, perform better than their counterparts with more natural ability.

Experts—we've referred to "expert" teachers throughout this discussion—are people who are highly knowledgeable and skilled in a particular domain, such as music, architecture, medicine, or teaching. Expert teachers' professional knowledge and skills are what set them apart from their less effective colleagues. This knowledge and these skills help them promote more learning in students than is possible by less capable teachers. This is why you're taking this course and studying this book. Your goal is to begin acquiring the knowledge and skills that will lead to expertise, and our goal is to help you in this process.

MyLab Education Self-Check 1.1

Educational Psychology, Professional Knowledge, and Expert Teaching

1.2: Describe the types of professional knowledge that expert teachers possess.

Educational psychology is the academic discipline that focuses on the scientific study of human learning and teaching (Berliner, 2006). The content of educational psychology focuses on the professional knowledge you will acquire as your teaching expertise develops. We discuss this professional knowledge in the following sections.

Professional Knowledge

Professional knowledge refers to the knowledge and skills unique to an area of study, such as law, medicine, architecture, or engineering. The same applies to teaching. In this section we focus on how educational psychology can increase your professional knowledge, and with it, your expertise.

Ed Psych and You

How much do you know about teaching and learning? To test your knowledge, complete the following *Learning and Teaching Inventory*. It will introduce you to the kinds of knowledge you'll need to become an expert teacher.

Learning and Teaching Inventory

Look at each of the 12 items below and decide if the statement is true or false.

1. The thinking of children in elementary schools tends to be limited to the concrete and tangible, whereas the thinking of middle and high school students tends to be abstract.
2. Students generally understand how much they know about a topic.
3. Experts in the area of intelligence view knowledge of facts, such as "On what continent is Brazil?" as one indicator of intelligence.

4. Expert teaching is essentially a process of presenting information to students in succinct and organized ways.
5. Preservice teachers who major in a content area, such as math, are much more successful than nonmajors in providing clear examples of the ideas they teach.
6. To increase students' motivation to learn, teachers should praise them liberally and as much as possible.
7. The key to successful classroom management is to stop classroom disruptions quickly.
8. Preservice teachers generally believe they will be more effective than teachers who are already in the field.
9. Teachers learn by teaching; in general, experience is the primary factor involved in learning to teach.
10. Students learn most effectively when they receive information consistent with their **learning styles**, their preferred approaches to thinking and problem solving.
11. Criticizing students damages their self-esteem and should be avoided.
12. Because some students are left-brained thinkers and others are right-brained thinkers, teachers should make an effort to accommodate these differences in their students.

Let's see how you did. The correct answers for each item are outlined in the following paragraphs. As you read the answers, remember that they describe students or people in general, and exceptions will exist.

1. *The thinking of children in elementary schools tends to be limited to the concrete and tangible, whereas the thinking of middle and high school students tends to be abstract.*
   False: Research indicates that middle school, high school, and even university students effectively think in the abstract only when they have considerable prior knowledge and experience related to the topic they're studying (Berk, 2019a). When you study the development of students' thinking in Chapter 2, you'll see how understanding this research can improve your teaching.
2. *Students generally understand how much they know about a topic.*
   False: Learners, in general, and young children in particular, often cannot accurately assess their own understanding (Hacker, Bol, Horgan, & Rakow, 2000). Students' awareness of what they know and how they learn strongly influences understanding, and cognitive learning theory helps us understand why. (You will study cognitive learning theory in Chapters 7, 8, and 9.)
3. *Experts in the area of intelligence view knowledge of facts, such as "On what continent is Brazil?" as one indicator of intelligence.*
   True: The Wechsler Intelligence Scale for Children—Fourth Edition (Wechsler, 2014), the most popular intelligence test in use today, includes several items similar to this example. We examine theories of intelligence, including controversies involved in these theories, in Chapter 5.
4. *Expert teaching is essentially a process of presenting information to students in succinct and organized ways.*
   False: The better we understand learning, the more we realize that simply explaining information to students is often ineffective (Kunter et al., 2013; Pomerance, Greenberg, & Walsh, 2016). Learners construct their own knowledge based on what they already know, and their emotions, beliefs, and expectations all influence the process (Bruning, Schraw, & Norby, 2011; Schunk, Meece, & Pintrich, 2014). You will study knowledge construction in Chapter 9.
5. *Preservice teachers who major in a content area, such as math, are much more successful than nonmajors in providing clear examples of the ideas they teach.*

False: One of the most pervasive misconceptions about teaching is the idea that knowledge of subject matter is all that's necessary to teach effectively. In a study of teacher candidates, researchers found that math majors were no more capable than nonmajors of effectively illustrating math concepts in ways that learners could understand (U.S. Department of Education, 2008). Knowledge of content is obviously important, but teaching expertise requires additional understanding, understanding how to make that content meaningful to students (Ayers, 2018; Buchholtz, 2017). (You will study ways of making knowledge accessible to learners in Chapters 2, 6–9, and 13.)

6. *To increase students' motivation to learn, teachers should praise them liberally and as much as possible.*
   False: Although appropriate use of praise is effective, overuse detracts from its credibility. This is particularly true for older students, who discount praise if they believe it is invalid or insincere. Older students may also interpret praise given for easy tasks as indicating that the teacher thinks they have low ability (Schunk et al., 2014). Your study of motivation in Chapters 10 and 11 will help you understand how teachers can increase students' motivation to learn.
7. *The key to successful classroom management is to stop disruptions quickly.*
   False: Research indicates that classroom management, a primary concern of beginning teachers, is most effective when, instead of responding to problems after they occur, teachers prevent management problems from occurring in the first place (Emmer & Evertson, 2017; Evertson & Emmer, 2017). (You will study classroom management in Chapter 12.)
8. *Preservice teachers generally believe they will be more effective than teachers who are already in the field.*
   True: Preservice teachers (like you) are often optimistic and idealistic. They believe they'll be effective with young people, and they generally believe they'll be better than teachers now in the field (Ingersoll & Smith, 2004). They are also sometimes "shocked" when they begin work and face the challenge of teaching on their own for the first time (Grant, 2006; Johnson & Birkeland, 2003). Teaching is complex and challenging, and the more knowledge you have about learners, learning, and the teaching process, the better prepared you'll be to cope with the realities of your first job.
9. *Teachers learn by teaching; in general, experience is the primary factor involved in learning to teach.*
   False: Experience is essential in learning to teach, but it isn't sufficient by itself (Depaepe & König, 2018; König & Pflanzl, 2016). In many cases, experience results in repeating the same actions year after year, regardless of their effectiveness (Staub, 2016). Knowledge of learners and learning, combined with experience, however, can lead to high levels of teaching expertise.
10. *Students learn most effectively when they receive information consistent with their learning styles, their preferred approaches to thinking and problem solving.*
    False: Research consistently indicates that attempts to accommodate students' different learning styles fail to increase achievement, and in some cases even detract from learning (Howard-Jones, 2014; Masson & Sarrasin, 2015; Pashler, McDaniel, Rohrer, & Bjork, 2008). Further, "There is no credible evidence that learning styles exist" (Riener & Willingham, 2010, p. 22). We examine the concept of learning styles in Chapters 2 and 5.
11. *Criticizing students damages their self-esteem and should be avoided.*
    False. Under certain circumstances, criticism can increase motivation and learning. For instance, criticism, such as a teacher saying, "Come on, you can do better work than this," communicates high expectations to students and the belief that they are capable learners. We're not suggesting that you make criticizing students a habit, but periodic and well-timed criticism can enhance motivation (Deci & Ryan, 2008).

12. *Because some students are left-brained thinkers and others are right-brained thinkers, teachers should make an effort to accommodate these differences in their students.*
False. The idea that we tend to be right-brained or left-brained is a myth (Im, Cho, Dubinsky, & Varma, 2018; Staub, 2016). "This popular myth, which conjures up an image of one side of our brains crackling with activity while the other lies dormant, has its roots in outdated findings from the 1970s . . . " (Boehm, 2012, para. 1).

These items introduce you to the professional knowledge base of teaching, and we now examine this knowledge in more detail. Research indicates that four related types of knowledge are essential for expert teaching (Darling-Hammond & Baratz-Snowdon, 2005; Kunter et al., 2013; Shulman, 1987). They're outlined in Figure 1.1 and discussed in the sections that follow.

Knowledge of Content

We obviously can't teach what we don't understand. To effectively teach about the American Revolutionary War, for instance, a social studies teacher needs to know basic facts about the war and also how the war relates to other historical events and factors, such as the French and Indian War, the colonies' relationship with England before the Revolution, and the unique characteristics of the colonies. The same is true for any topic in any other content area, and research confirms the relationship between what teachers know and how they teach (Bransford, Brown, & Cocking, 2000).

Pedagogical Content Knowledge

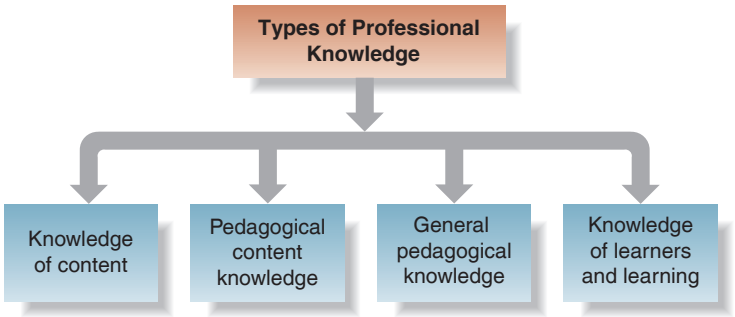
Knowledge of content is necessary but not sufficient for expert teaching. We must also possess **pedagogical content knowledge (PCK)**, an understanding of how to represent topics in ways that make them understandable to learners, as well as an understanding of what makes specific topics easy or difficult to learn (Ayers, 2018; Buchholz, 2017).

This dimension of teacher knowledge increases both achievement and learner motivation. "Teachers' PCK affects not only students' achievement but also their motivation, specifically their enjoyment of the subject. . . " (Kunter et al., 2013, p. 815). Expert teachers understand the content they teach, and they also know how to make it understandable and interesting to students.

So, as you study specific topics in your content area, such as math, social studies, science, or any other, ask yourself, "How can I illustrate this topic so students can understand it?" The ability to do so will reflect your pedagogical content knowledge, and it is one of the most important aspects of teaching expertise.

Developing Pedagogical Content Knowledge. Developing our ability to illustrate topics—our PCK—need not be extremely difficult. With practice, experience, and a mindset where we commit ourselves to providing our students with examples and other representations that are understandable to them, ideas will come to mind.

Figure 1.1 Types of professional knowledge



For instance, suppose we want our students to understand the concept *density*, which represents the amount of mass (material) in a certain volume—a concept with which many students, including those that are older, struggle. We can illustrate this concept for our students with cotton balls in a transparent drink cup as we see here.

Then, when we compress the cotton in the cup, students can see that the same amount of cotton (mass) takes up less space (occupies less volume), so the cotton is more dense.

Illustrating the concept this way is much more meaningful for students than using the formula D = m/v, which is the way *density* is usually represented, and which many students memorize with little understanding.

As a second example, suppose you're a language arts teacher and you want your students to understand the concept *gerund*, a verb form that behaves as a noun, and *participle*, a verb form that behaves as an adjective. To illustrate these concepts you might display the following short paragraph for your students.

Running is a very good form of exercise, and athletes, such as running backs in football, have to be in very good physical shape. I'm running a three miler this afternoon.

Here students can see that "running" is first used as a noun: (*Running* is a very good form of exercise); then as an adjective: (. . . such as *running* backs in football); and finally as a verb: (I'm *running* a three-miler this afternoon). Represented this way, students can see how the verb forms are used. They don't have to try and understand the concepts based on abstract and often confusing definitions. The ability to represent topics in this way again illustrates pedagogical content knowledge.

Finally, suppose you're a geography teacher and you want to illustrate the concepts *longitude* and *latitude* for your students. You might draw lines on a beach ball as you see here.

As with the language arts example, students can see that the latitude lines are parallel to each other, and the longitude lines meet at the poles. Then, during discussion, we can guide our students to recognize that lines of longitude are farthest apart at the equator, but lines of latitude are the same distance apart everywhere, and that longitude measures distance east and west, whereas latitude measures distance north and south.

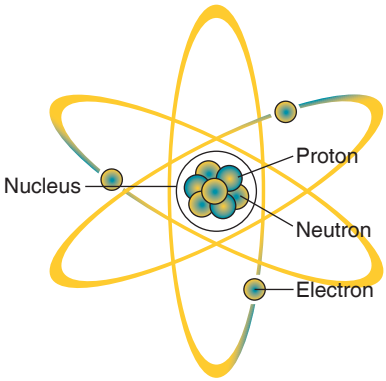
Sophia, Keith, and Kelsey, the teachers in the case studies at the beginning of the chapter, each demonstrated pedagogical content knowledge in their instruction—Sophia wrote a short paragraph illustrating subject–verb agreement for her 1st-graders, Keith brought real-world examples of using decimals and percents with his middle schoolers, and Kelsey used a written clip as an example of an author who did and did not provide evidence for a claim. Their ability to represent their topics in these ways is part of the professional knowledge that contributes to teaching expertise.

These are merely examples, and you will find and develop many others when you teach. Depending on the content area, you can represent the topics you teach in several ways:

- *Examples.* Examples, such as the illustrations of *equivalent fractions*, *density*, *gerund*, *participle*, and *longitude* and *latitude*, are useful when we're teaching well-defined topics (Pomerance et al., 2016).
- *Case studies and vignettes.* We use case studies, lessons, and other classroom events taken from the real world of teaching to illustrate the topics we discuss. Sophia's, Keith's, and Kelsey's lessons at the beginning of the chapter are examples of these case studies. They're designed to provide you with concrete instances of teachers in actual classrooms working with real students. Together with vignettes—shorter case studies—they're intended to make the complex topics you'll study understandable and meaningful. For instance, an English teacher might illustrate the concept *internal conflict* with this brief vignette:

Andrea didn't know what to do. She was looking forward to the class trip, but if she went, she wouldn't be able to take the scholarship-qualifying test.

- *Simulations.* **Simulations**, imitations of real-world processes or systems, can be effective for representing topics difficult to illustrate directly (Li, Dai, Zheng, Tian, & Yan, 2018). For instance, an American government teacher creates a mock trial to simulate the workings of our country's judicial system, and a world history teacher uses her students' loyalty to their school, their ways of talking, and their weekend activities to simulate the concept *nationalism*. Another history teacher uses her class's "crusade" for extracurricular activities as a simulation for the actual Crusades.
- *Models.* Models allow students to visualize what they can't observe directly. For instance, a science teacher uses a model of an atom to help students visualize the organization of the nucleus and electrons, as you see here.



This list helps us understand why knowledge of content and pedagogical content knowledge are related but not identical, and it also helps explain why item 5 in our Learning and Teaching Inventory ("Preservice teachers who major in a content area, such as math, are much more successful than nonmajors in providing clear examples of the ideas they teach") is false. Earning a degree in a content area, such as math, doesn't ensure that someone will be able to create examples—a form of PCK—like the one involving equivalent fractions, nor does majoring in history ensure that a person would be able to think of using a campaign to save a school's extracurricular activities—another instance of PCK—to simulate the Crusades. If we lack either knowledge of content or PCK, we commonly paraphrase information in learners' textbooks or provide abstract explanations that aren't meaningful to our students. We need both kinds of professional knowledge to become expert teachers.

General Pedagogical Knowledge

Knowledge of content and PCK are domain specific, that is, they're related to knowledge of a particular content area, such as the Crusades, multiplying fractions, or the concepts *density, gerund, participle,* or *internal conflict*. In comparison, **general pedagogical knowledge (GPK)** involves an understanding of instructional strategies and classroom management that apply to all subject matter areas and topics (Depaepe & König, 2018). Preservice teachers, such as yourselves, tend to downplay the importance of GPK, and, as a result, reduce their efforts to acquire the skills associated with it (Merk, Rosman, Rueß, Syring, & Schneider, 2017). We urge you to avoid falling into this trap, because research confirms the importance of GPK as a prerequisite for teaching expertise (König, & Pflanzl, 2016). Further, teachers high in GPK are less likely to burn out and more likely to believe that they're capable of promoting learning in their students, regardless of conditions (Lauermann & König, 2016).

Instructional Strategies. Instructional strategies, one form of GPK, involve abilities such as knowing how to organize lessons, engaging students in learning activities, and checking for understanding. Instructional strategies are important regardless of the grade level, content area, or topic. For instance, careful planning, organizing instruction, and questioning skills are as important if you're teaching 1st-graders, middle school learners, or advanced high school students (Good & Lavigne, 2018; Lemov, 2015). These strategies are essential aspects of general pedagogical knowledge, and you will study them in detail in Chapter 13.

Classroom Management. Classroom management is a second essential component of GPK. To be effective, we need to create classroom environments that are safe, orderly, and focused on learning (Emmer & Evertson, 2017; Evertson & Emmer, 2017). To meet

this goal, we must know how to plan, implement, and monitor rules and procedures, organize groups, and intervene when misbehavior occurs. The complexities of these processes help us see why item 7 in the Learning and Teaching Inventory ("The key to successful classroom management is to stop disruptions quickly") is false. It's impossible to maintain an orderly classroom if we wait for misbehavior to occur. We discuss ways of creating orderly environments to prevent management problems in Chapter 12.

MyLab Education
Video Example 1.1
Professional knowledge is essential for expert teaching. Notice how sixth-grade teacher, Dani Ramsay, demonstrates pedagogical content knowledge in the way she illustrates the concept of *personification*, general pedagogical knowledge in the way she interacts with her students, and knowledge of learners and learning in realizing that students learn more when they're involved in learning activities.

Knowledge of Learners and Learning

Knowledge of learners and learning, an understanding of the learning process and how students learn and develop, is the fourth type of professional knowledge. It is also essential, "arguably the most important knowledge a teacher can have" (Borko & Putnam, 1996, p. 675). Let's see how this knowledge can influence the way we teach.

The following items from the Learning and Teaching Inventory all involve knowledge of learners and learning.

Item 1: The thinking of children in elementary schools tends to be limited to the concrete and tangible, whereas the thinking of middle and high school students tends to be abstract. We know that students need to have abstract ideas illustrated with concrete examples, and this is true for older as well as younger students. Chapter 2 helps us understand how students' thinking develops, and helps us understand how to represent topics in developmentally appropriate ways.

Item 2: Students generally understand how much they know about a topic. Learners often aren't good judges of either how much they know or the way they learn. Chapters 7 and 8 help us understand how to make our students more aware of the way they think and how to become more strategic in their approaches to learning.

Item 4: Effective teaching is essentially a process of presenting information to students in succinct and organized ways. Our increasing understanding of the way people learn helps explain why this item is false. We now realize that learners don't behave like video recorders; we don't simply remember what we hear or read. Rather, in our attempts to make sense of the information, we interpret it in personal and sometimes idiosyncratic ways (Chatera & Loewenstein, 2016; Dubinsky, Roehrig, & Varma, 2013). In the process, meaning can be distorted, sometimes profoundly. For instance, the following statements were actually made by students:

"The phases of the moon are caused by clouds blocking out the unseen parts."
"Coats keep us warm by generating heat, like a stove or radiator."
"A triangle which has an angle of 135 degrees is called an obscene triangle."

Obviously, students didn't acquire these ideas from their teachers' explanations. Rather, they interpreted what they heard, experienced, or read, related it to what they already knew, and attempted to make sense of it.

Item 6: To increase students' motivation to learn, teachers should praise liberally and as much as possible. Item 6 has implications for the ways we interact with our students. Intuitively, it seems that providing as much praise as possible is desirable and effective. However, motivation research, which we examine in Chapters 10 and 11, helps us understand why this isn't always the case.

Item 9: Teachers learn by teaching; in general, experience is the primary factor involved in learning to teach. We now understand why this item is false. Experience is important, but we can't acquire all the knowledge we need to be effective from experience alone (Goldhaber, 2016). Acquiring this knowledge is the primary reason you're studying educational psychology.

MyLab Education Application Exercise 1.1: Demonstrating Professional Knowledge in Classrooms

In this exercise you will be asked to analyze how a teacher demonstrates different types of professional knowledge.

Professional Organizations' Contributions to Professional Knowledge

Professional organizations have also examined a wide range of research, which they have compiled and summarized in attempts to provide guidance for teachers as we work with our students.

Developmentally Appropriate Practice

Using Knowledge of Learners and Learning to Promote Achievement in Students at Different Ages

While much of what we know about learners and learning applies to students of all ages, **developmental differences**, age-related changes in students' thinking, personalities, and social skills, exist.

Because the developmental level of your students affects their learning and your teaching, a feature titled "Developmentally Appropriate Practice" appears in each chapter. **Developmentally appropriate practice** refers to instruction that matches teacher actions to the capabilities and needs of learners at different developmental levels. This feature describes ways to adapt each chapter's content to the different learning needs of early childhood and elementary, middle school, and high school students.

Here's how the feature will appear in subsequent chapters:

Working with Students in Early Childhood Programs and Elementary Schools

Young children's thinking differs from the thinking of older students. As an example, look at the accompanying cartoon. Wondering how all the water could fit in the spigot is characteristic of the thinking of young children. Older students would of course realize that a vast reservoir of water exists that we can't see. Young children's personal and social characteristics also differ from those of older students and influence how they interact and learn in classrooms.

We examine these differences in each of the chapters in the book.

Working with Students in Middle Schools

As a result of maturation and experience, the thinking and social skills of middle school students differ from those of young children. For example, older students are more likely to realize that they don't understand an idea being discussed in class and raise their hands to ask for an explanation. In addition, middle schoolers are increasingly social and find the opposite sex more interesting. These developmental differences have important implications for how we teach and interact with these students.

"How do they fit so much water in that little spigot?"

Working with Students in High Schools

As with differences between elementary and middle school students, additional differences exist between high school learners and their younger counterparts. For example, many high school students are quite mature, and discussing personal and social issues with them on an adult-to-adult level can be effective. They are capable of more abstract thinking than their younger counterparts, although they still need concrete examples to understand new or difficult topics.

In this section we examine the work of two of these organizations:

- The American Psychological Association
- The National Council on Teacher Quality

The American Psychological Association: Top 20 Principles from Psychology for PreK–12 Teaching and Learning

The American Psychological Association (APA), founded in 1892, now has more than 100,000 members in 54 divisions, one of which is Educational Psychology. APA's stated mission is to advance, communicate, and apply psychological knowledge to benefit society and improve people's lives (American Psychological Association, 2018).

Consistent with this mission, the "Top 20 Principles from Psychology for PreK–12 Teaching and Learning" is APA's effort to help teachers and teacher educators apply psychological knowledge to the teaching–learning process. Researchers have identified a number of principles that provide guidance for us as teachers, and they've found 20 that they believe are particularly relevant for our work with students. These are the "Top 20" (American Psychological Association, Coalition for Psychology in Schools and Education, 2015).

They're grouped into five areas:

- Cognition and learning
- Motivation
- Social context, interpersonal relations, and emotional well-being
- Classroom management
- Assessment

Cognition and learning. **Cognition** refers to thinking, so when we refer to "cognitive" tasks we're describing tasks that require thought—often careful and sustained thought. Cognition includes beliefs, perceptions, and expectations; it depends on experience and prior knowledge; and it's influenced by practice and feedback.

Cognition and learning are the focus of principles 1–8, and these principles answer the question: How do students think and learn?

- *Principle 1: Students' beliefs or perceptions about intelligence and ability affect their cognitive functioning and learning*. Students who believe that intelligence or ability can be improved with effort learn more and perform better on a variety of cognitive tasks (Aronson & Juarez, 2012; Dweck, 2016).
- *Principle 2: What students already know affects their learning*. Learners make sense of new knowledge and experiences based on their existing knowledge. If students lack prior knowledge, we, as teachers, must provide it (Holding, Denton, Kulesza, & Ridgway, 2014; Johnson & Sinatra, 2014).
- *Principle 3: Students' cognitive development and learning are not limited by general stages of development*. Student thinking and reasoning are more nearly influenced by prior knowledge than chronological age (Bjorklund & Causey, 2018; Rogoff, 2003).
- *Principle 4: Learning is based on context, so generalizing learning to new contexts is not spontaneous but instead needs to be facilitated.* Transfer of learning is very specific, so, for instance, students won't automatically transfer basic skills they've learned in math to word problems involving the same basic skills (Bransford, Brown, & Cocking, 2000; Mayer, 2008).
- *Principle 5: Acquiring long-term knowledge and skill is largely dependent on practice*. A magic solution to learning doesn't exist. As demonstrated by athletes, musicians, academicians, and others, practice with feedback is the primary route to advanced knowledge and skills (Eskreis-Winkler et al., 2016; Panero, 2016).
- *Principle 6: Clear, explanatory, and timely feedback to students is important for learning.* Student learning increases when they're provided with specific information about their current level of understanding (Hattie, 2012; Hattie & Timperley, 2007).