1

Introduction to Educational Psychology

Big Ideas to Master in this Chapter

1.1 Effective teachers use research findings and research-based theories to make decisions about instructional strategies, classroom management, and assessment practices.

1.2 Effective teachers continually work to enhance their professional knowledge and skills.

1.3 Learners read, study, and learn more efficiently when they plan appropriately and use effective strategies.

CASE STUDY: THE "NO D" POLICY

Anne Smith is a ninth-grade English teacher with 10 years of teaching experience, and by all accounts she's an excellent teacher. Even so, in previous years many of her students haven't invested much time or energy in their writing assignments and seemingly haven't been bothered by the Cs and Ds they've earned in her classes. In an effort to more fully engage this year's students in their schoolwork, Ms. Smith begins the school year by initiating two new policies. First, to pass her course, students must earn at least a C; she won't give anyone a final grade of D. Second, students will have multiple opportunities to revise and resubmit assignments. She'll give whatever feedback students need on the assignments—and, if necessary, one-on-one instruction—to help them improve their work. She solicits students' questions and concerns about the new policies, gains their agreement to "try something new," and engages them in a discussion of specific, concrete characteristics of A-quality, B-quality, and C-quality work. Then, as the school year progresses, she regularly administers brief surveys to get students' feedback about her innovations, asking such questions as "How is the 'no D' policy working for you?" "Do you think your grade is an accurate reflection of your learning?" and "Any suggestions?"

Students' responses on the surveys are overwhelmingly positive. Students mention noticeable improvements in the quality of their writing and increasingly report that they believe themselves to be in control of both their learning and their grades. Furthermore, they begin to see their teacher in a new light—"as one who will help them achieve their best work, not as one who just gives out grades . . . as a coach encouraging them along the long race of learning." Final course grades also confirm the value of the new policies: A much higher percentage of students earn grades of C or better than has been true in past years.[1]

- Effective teachers don't simply transmit new information and skills to students; they also work hard to help students *master* the information and skills. In the case study just presented, what strategies does Ms. Smith use to foster her students' writing development?

Teaching other people—especially teaching the generation that will follow you into the adult world—can be one of the most rewarding professions on the planet. It can also be a very challenging profession. Certainly effective teaching involves presenting a topic or skill in such a way that students can understand and master it. Yet it involves many other things as well. For instance, teachers must motivate students to *want* to learn the subject matter, must help students recognize what true mastery involves, and—to appropriately individualize instruction—must assess where each student currently is in his or her learning and development. And, in general, effective teachers create an environment in which students believe that if they work hard and have reasonable support, they can achieve at high levels. In the opening case study, Anne Smith does all of these things.

How children and adolescents think and learn, what knowledge and skills they have and haven't mastered, where they are in their developmental journeys, what their interests and

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[1] Action research project described in A. K. Smith, 2009.

priorities are—all of these factors influence the effectiveness of various classroom strategies. Thus, the decisions *teachers* make in the classroom—decisions about what topics and skills to teach (*planning*), how to teach those topics and skills (*instruction*), how to keep students on task and supportive of one another's learning efforts (creating an effective *classroom environment*), and how best to determine what students have learned (*assessment*)—must ultimately depend on students' existing characteristics and behaviors.

Of course, as we saw from Anne Smith in the opening case study, teachers' classroom strategies also change what *students* know, think, and can do. Thus, the relationship between student characteristics and behaviors, on the one hand, and teacher strategies, on the other, is a two-way street. Furthermore, as you'll discover in later chapters, planning, instruction, the classroom environment, and assessment practices influence one another, as depicted in Figure 1.1. Notice how student characteristics and behaviors are at the center of the figure, because these must drive almost everything that teachers do in the classroom. Such an approach to teaching is sometimes known as learner-centered instruction.[2]

The purpose of this book is to help you understand children and adolescents—how they learn and develop, how they're likely to be similar to but also different from one another, what activities and assignments are apt to engage them in the classroom, and so on. It will also give you a toolbox of strategies for planning and carrying out instruction, creating an environment that keeps students motivated and on task, and assessing students' progress and achievement. Such topics are the domain of educational psychology, which is an academic discipline that (a) systematically studies the nature of human learning, development, motivation, and related topics and (b) applies its research findings to the identification and development of effective instructional practices. We begin by exploring how teachers can use different types of research findings to make instructional decisions.

FIGURE 1.1 A learner-centered model of instruction
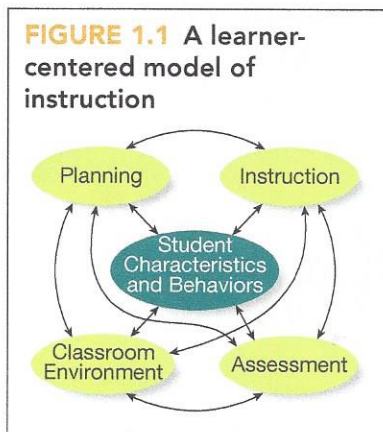
1.1 USING RESEARCH FINDINGS TO MAKE INSTRUCTIONAL DECISIONS

Big Idea 1.1 Effective teachers use research findings and research-based theories to make decisions about instructional strategies, classroom management, and assessment practices.

Teachers make instructional decisions based on their prior experiences, advice from others, knowledge and skills they learned in their formal schooling, and so on. Although many of these sources of information are potentially useful to teachers' instructional decisions, effective teachers rely on research findings and research-based theories to inform their practices. In the principles that follow, we discuss why teachers need to understand research, we examine the different types of research conducted by educational psychologists, and we explain how this research can be synthesized and organized to be helpful to teachers.

The effectiveness of various classroom practices can best be determined through systematic research.

You yourself have been a student for many years now, and you've undoubtedly learned a great deal about how individuals learn and develop and about how teachers can foster their learning and development. But exactly how much *do* you know? To help you find out, one of us authors has developed a short pretest titled *Ormrod's Own Psychological Survey (OOPS)*.

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[2] For good general discussions of learner-centered instructional practices, see McCombs, 2005; National Research Council, 2000. You may also want to look at the American Psychological Association's (APA's) 14 *Learner-Centered Psychological Principles* on the APA website at www.apa.org; type "learner-centered principles" in the search box on APA's home page.

––––––––––––––––––– **SEE FOR YOURSELF** –––––––––––––––––––
ORMROD'S OWN PSYCHOLOGICAL SURVEY (OOPS)

Decide whether each of the following statements is *true* or *false*.

True/False

_____ 1. Some children are predominantly left-brain thinkers, whereas others are predominantly right-brain thinkers.

_____ 2. The best way to learn and remember a new fact is to repeat it over and over.

_____ 3. Students often misjudge how much they know about a topic.

_____ 4. Anxiety sometimes helps students learn and perform more successfully in the classroom.

_____ 5. Instruction is most effective when it is tailored to students' individual learning styles.

_____ 6. Children's personalities are largely the result of their home environments.

_____ 7. Playing video games can enhance children's cognitive development.

_____ 8. The ways in which teachers assess students' learning influence what and how students actually learn.

Now let's see how well you did on the OOPS. The answers, along with an explanation for each one, are as follows:

1. **Some children are predominantly left-brain thinkers, whereas others are predominantly right-brain thinkers.** FALSE—With the development of new medical technologies in recent years, researchers have learned a great deal about how the human brain works and which parts of it specialize in which aspects of human thinking. As we'll discover in Chapter 2, the two halves, or *hemispheres,* of the brain do seem to have somewhat different specialties, but they continually communicate and collaborate in tackling even the simplest of daily tasks. Practically speaking, there's no such thing as left-brain or right-brain thinking.[3]

2. **The best way to learn and remember a new fact is to repeat it over and over.** FALSE—Although repeating new information several times is better than doing nothing at all with it, repetition of specific facts is a relatively *in*effective way to learn. Students learn new information more easily and remember it longer when they connect it with things they already know. One especially effective strategy is elaboration: using prior knowledge to expand or embellish on a new idea in some way, perhaps by drawing inferences from a historical fact, identifying new examples of a scientific concept, or thinking of situations in which a mathematical procedure might be helpful. Chapter 2 describes several cognitive processes that help students learn and remember school subject matter effectively.

3. **Students often misjudge how much they know about a topic.** TRUE—Contrary to popular opinion, students are usually *not* the best judges of what they do and don't know. For example, many students think that if they've spent a long time studying a textbook chapter, they must know its contents very well. Yet if they've spent most of their study time inefficiently—perhaps by "reading" while thinking about something else altogether or by mindlessly copying definitions—they may know far less than they think they do. We'll consider this *illusion of knowing* further in Chapter 3.

4. **Anxiety sometimes helps students learn and perform more successfully in the classroom.** TRUE—Many people think that anxiety is always a bad thing. In fact, a little bit of anxiety can actually *improve* learning and performance, especially when students perceive a task to be something they can accomplish with reasonable effort. For instance, a small, manageable amount of anxiety can spur students to complete their work carefully and to study for tests. We'll explore the effects of anxiety and other emotions in Chapter 5.

5. **Instruction is most effective when it is tailored to students' individual learning styles.** FALSE—Contrary to a popular belief, most measures of supposed "learning styles" merely reflect students' self-reported *preferences,* and tailoring instruction to such preferences doesn't

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[3] Siegel, Alexander, & Tse, 2016.

noticeably enhance students' learning or academic achievement.[4] It is far more important that teachers base their instructional practices on knowledge of the cognitive processes that underlie how virtually *all* students think and learn. We'll learn more about students' preferences and *cognitive styles* in Chapter 6.

6. **Children's personalities are largely the result of their home environments.** FALSE—Certainly children's home environments shape their behaviors to some extent. But heredity also has a significant impact. From birth, infants are noticeably different in the extent to which they're calm or fussy, shy or outgoing, fearful or adventurous, and so on. As we'll see in Chapter 7, such differences in *temperament* appear to have their roots in biology and genetics, and they persist throughout the childhood years and into adulthood.

7. **Playing video games can enhance children's cognitive development.** TRUE or, more accurately, SOMETIMES TRUE—A great deal of time spent playing video games *instead of* reading, doing homework, and engaging in other school-related activities can definitely interfere with children's long-term academic success. But some video games can be powerful tools for promoting important cognitive abilities, such as spatial abilities and the flexible use of attention.[5] And educational technologists have increasingly been designing highly motivating video games that simulate real-world problems and foster complex problem-solving skills.[6] In upcoming chapters (especially Chapter 4 and Chapter 8), we'll examine many ways in which computer technologies can support students' learning and cognitive development.

8. **The ways in which teachers assess students' learning influence what and how students actually learn.** TRUE—What and how students learn depend, in part, on how they expect their learning to be assessed. For example, in the opening case study, Anne Smith's "No D" and multiple-submission policies encourage students to seek feedback about their work, benefit from their mistakes, and enhance their writing skills. In Chapter 10 we'll look more closely at the potential effects of classroom assessment practices on students' learning.

How many of the OOPS items did you answer correctly? Did some of the false items seem convincing enough that you marked them true? Did some of the true items contradict certain beliefs you had? If either of these was the case, you're hardly alone. College students often agree with statements that seem obvious but are, in fact, partially or completely incorrect.[7] Furthermore, many students in teacher education classes reject research findings when those findings appear to contradict their personal beliefs and experiences.[8]

It's easy to be persuaded by "common sense" and assume that what seems logical must be true. Yet common sense and logic don't always give us the real scoop about how people actually learn and develop, nor do they always give us appropriate guidance about how best to help students succeed in the classroom. Educational psychologists believe that knowledge about teaching and learning should come from a more objective source of information—that is, from systematic research. Increasingly, educators and policy makers alike are calling for evidence-based practices—the use of instructional methods and other classroom strategies that research has consistently shown to bring about significant gains in students' development and academic achievement.[9]

Educational psychologists focus on the scientific study of psychological principles that are relevant to education.

Integrating evidence-based practices into your teaching takes time and practice, of course. But it also takes knowledge of topics within the discipline of educational psychology, including knowledge of human learning and motivation, developmental trends, individual and group differences, classroom assessment and standardized testing, and effective classroom practices. Educational psychologists

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[4] Kirschner & van Merriënboer, 2013; Kozhevnikov, Evans, & Kosslyn, 2014; Krätzig & Arbuthnott, 2006; Mayer & Massa, 2003.

[5] Green, 2014; Rothbart, 2011; Tobias & Fletcher, 2011.

[6] Blumberg, 2014; Squire, 2011.

[7] Gage, 1991; L. S. Goldstein & Lake, 2000; Woolfolk Hoy, Davis, & Pape, 2006.

[8] Gregoire, 2003; Holt-Reynolds, 1992; T. M. McDevitt & Ormrod, 2008; Patrick & Pintrich, 2001.

[9] Cook, Smith, & Tankersley, 2012. For example, see Darling-Hammond & Bransford, 2005; Waterhouse, 2006.

develop this knowledge by solving problems in the field of education through the use of rigorous scientific methods.[10] Topics in educational psychology are also studied by researchers in closely related disciplines, such as education, instructional design and technology, learning science, cognitive science, and other overlapping areas of psychology (e.g., behavioral, cognitive, developmental, social, and school psychology). In addition, neurologists, cognitive psychologists, and researchers from other disciplines are working together to discover how the *brain* influences people's behavior and learning and, conversely, how people's behavior and learning experiences can influence brain development. This rapidly expanding field, known as *cognitive neuroscience,* is making many noteworthy contributions to our understanding of human learning. As Figure 1.2 shows, educational psychology informs and is informed by many different disciplines.

One way that individuals contribute to the field of educational psychology is to publish their research findings in academic journals and books. Many educational psychologists also belong to regional, national, and international organizations to share their research and discuss ideas with others (see Figure 1.3 for examples). We authors synthesized much of this research in developing the Big Ideas presented in this book.

When educational psychologists write about and present their research, they identify the particular research articles, books, conference presentations, and other sources on which they base their claims. Most educational psychology publications and conferences require authors to follow APA style, guidelines prescribed by the American Psychological Association for identifying sources and preparing references.[11] In APA style, a source is cited by presenting the author(s) and date of publication in the body of the text. For example, this sentence from a prior paragraph would be cited as follows in APA style: College students often agree with statements that seem obvious but are, in fact, partially or completely incorrect (Gage, 1991; Goldstein & Lake, 2000; Woolfolk Hoy, Davis, & Pape, 2006). In this book, we've intentionally deviated from APA style by presenting the references in footnotes. We hope this style will help you focus on the *ideas* instead of on the names and dates provided in the references. But when you find some of the book's ideas especially interesting, exciting, or surprising, we urge you to read the footnoted sources firsthand by finding the detailed citations in the book's References list.

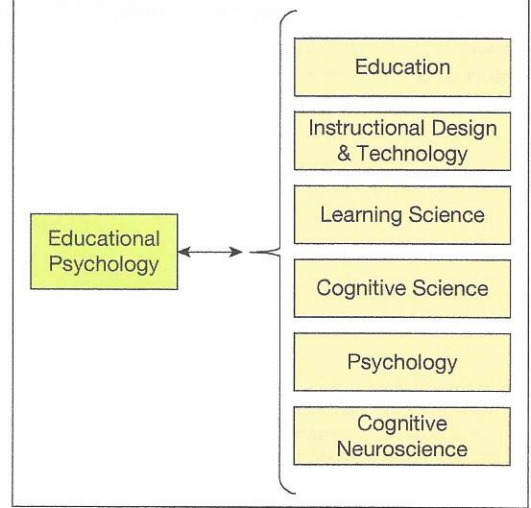FIGURE 1.2 Educational psychology informs and is informed by other disciplines.

FIGURE 1.3 Examples of organizations that represent educational psychology

Organizations	Website URL
American Educational Research Association (AERA)	http://aera.net/
American Psychological Association (APA)	http://www.apa.org/
Association for Psychological Science (APS)	http://www.psychologicalscience.org/
International Society of the Learning Sciences (ISLS)	https://www.isls.org/

Research can provide quantitative information, qualitative information, or both.

Many research studies involve quantitative research: They yield numbers that reflect percentages, frequencies, or averages related to certain characteristics or phenomena. For example, a quantitative study might provide information about students' scores on achievement tests, students' responses to rating-scale questionnaires, or school district records of students' attendance and dropout rates.

Other studies involve qualitative research: They yield nonnumeric data—perhaps in the form of verbal reports, written documents, pictures, or maps—that capture many aspects of a complex situation. For example, a qualitative study might involve lengthy interviews in which students describe their hopes for the future, a detailed case study of interpersonal relationships within a tight-knit clique of adolescent girls, or in-depth observations of several teachers who create distinctly different psychological atmospheres in their classrooms.

[10] Ames, Graham, & Urdan, 2012; Reynolds & Miller, 2013.
[11] For more information on APA style, see its *Publication Manual* (APA, 2010) or visit www.apastyle.org

Table 1.1 • Contrasting Various Types of Research

	QUALITATIVE RESEARCH	QUANTITATIVE RESEARCH		
	Descriptive Studies	**Descriptive Studies**	**Correlational Studies**	**Experimental and Quasi-Experimental Studies**
General Nature and Purposes	• Portray the complex, multifaceted nature of human behavior, especially in real-world social settings	• Capture the current state of affairs regarding a real-world issue or problem	• Identify associations among characteristics, behaviors, and/or environmental conditions • Enable predictions about one variable, given knowledge of the degree or quantity of another variable • Provide an alternative when experimental manipulations are unethical or impossible	• Manipulate one (independent) variable in order to observe its possible effect on another (dependent) variable • Eliminate other plausible explanations for observed outcomes (especially in carefully controlled experimental studies) • Enable conclusions about cause-and-effect relationships
Limitations	• Don't enable either predictions or conclusions about cause-and-effect relationships	• Don't enable either (1) predictions about one variable based on another variable or (2) conclusions about cause-and-effect relationships	• Enable only imprecise predictions, with many exceptions to the general relationships observed • Don't enable conclusions about cause-and-effect relationships	• May not completely eliminate alternative explanations for observed outcomes (especially true for quasi-experimental studies) • In some cases, involve artificial laboratory conditions that don't resemble real-life learning environments (true for many tightly controlled experimental studies)
Examples of Questions That Might Be Addressed	• What things do high-achieving students say they do "in their heads" when they read and study their textbooks? • What distinct qualities characterize high schools in which members of various adolescent gangs interact congenially and respectfully? • In what ways do teachers' instructional practices change when their jobs and salaries depend on their students' scores on statewide or national achievement tests?	• How pervasive are gender stereotypes in popular children's literature? • What kinds of aggressive behaviors occur in schools, and with what frequencies? • How well have students performed on a recent national achievement test?	• Are better readers also better spellers? • Are students more likely to be aggressive at school if they often see violence at home or in their neighborhoods? • To what extent are students' class grades correlated with their scores on achievement tests?	• Which of two reading programs produces greater gains in reading comprehension? • Which method is most effective in reducing aggressive behavior—reinforcing appropriate behavior, punishing aggressive behavior, or a combination of both? • Do different kinds of tests (e.g., multiple-choice vs. essay tests) encourage students to study in different ways?

Ultimately educators gain a better understanding of students and effective classroom practices when they consider findings from *both* quantitative and qualitative research. Research that includes both quantitative and qualitative elements is called mixed methods research.[12] For example, in the research project described in the opening case study, Anne Smith tabulates students' responses to various survey questions and computes the percentages of various final class grades—all of which are quantitative information. But when she collects students' completed surveys, she also looks closely at their specific comments and suggestions, which provide qualitative information.

Different kinds of research lead to different kinds of conclusions.

In addition to yielding either quantitative or qualitative data (or both), research studies typically fall into one of four general categories: descriptive, correlational, experimental, or quasi-experimental. These various kinds of studies enable different kinds of conclusions and are appropriate for different types of research questions (see Table 1.1).

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[12] Creswell, 2014.

A descriptive study does exactly what its name implies: It *describes* a situation. Descriptive studies might give us information about the characteristics of students, teachers, or schools. They might also provide information about how frequently certain events or behaviors occur. Descriptive studies allow us to draw conclusions about the way things are—the current state of affairs. Virtually all qualitative studies are primarily descriptive in nature, and some quantitative studies fall into the descriptive category as well.

A correlational study explores possible relationships among two or more variables. For example, it might tell us how closely various human characteristics are associated with each other, or it might give us information about the consistency with which certain human behaviors occur in conjunction with certain environmental conditions. In general, correlational studies enable us to draw conclusions about correlation: the extent to which two characteristics or phenomena tend to be found together or to change together. Two variables are correlated when one increases as the other increases (a *positive correlation*) or when one *decreases* as the other increases (a *negative correlation*) in a somewhat predictable manner. The bottom row of the fourth column in Table 1.1 presents three examples of possible correlational relationships: those between (1) reading and spelling ability, (2) aggressive behavior at school and violence at home, and (3) class grades and achievement test scores. Correlations are often described numerically with statistics known as *correlation coefficients*, described in Appendix A.

If a correlation exists between two variables, knowing the status of one variable allows us to make *predictions* about the other variable. For example, if we find a positive correlation between reading ability and spelling ability, we can predict that, on average, students who are proficient readers will also be good spellers. Our predictions will be imprecise at best, with exceptions to the general rule; for instance, we may occasionally see very good readers who are poor spellers. A more significant limitation of correlational studies is that although they may demonstrate that a relationship exists, they never tell us for certain *why* it exists. They don't tell us what specific factors—previous experiences, personality, motivation, or perhaps other things we haven't thought of—are the cause of the relationship we see. In other words, *correlation does not necessarily indicate causation.*

Descriptive and correlational studies describe things as they exist naturally in the environment. In contrast, an experimental study, or experiment, is a study in which the researcher somehow changes, or *manipulates,* one or more aspects of the environment (called *independent variables*) and then measures the effects of such changes on something else (called the *dependent variable*). In educational research the dependent variable is often some aspect of student behavior— perhaps end-of-year grades, skill in executing a complex physical movement, persistence in tackling difficult math problems, or ability to interact appropriately with peers.[13] In a good experiment a researcher *separates and controls variables,* testing the possible effects of one variable while keeping constant all other potentially influential variables. When carefully designed and conducted, experimental studies enable us to draw conclusions about causation—about what variables cause or influence certain other variables.

Often experimental studies involve two or more groups that are treated differently. Consider these examples:

- A researcher uses two different instructional methods to teach reading comprehension skills to two different groups of students. (Instructional method is the independent variable.) The researcher then assesses students' reading ability (the dependent variable) and compares the average reading-ability scores of the two groups.
- A researcher gives three different groups of students varying amounts of practice with woodworking skills. (Amount of practice is the independent variable.) The researcher subsequently scores the quality of each student's woodworking project (the dependent variable) and compares the average scores of the three groups.
- A researcher gives one group of students an intensive instructional program designed to improve their study skills. The researcher gives another group of students no instruction and gives a third group instruction in subject matter unrelated to study skills. (Presence

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You might think of the distinction this way: Student behavior (the dependent variable) *depends* on instructional methods or some other aspect of the environment (the independent variable).

or absence of instruction in study skills is the independent variable; the second and third groups did not receive instruction in study skills.) The researcher later (1) assesses the quality of students' study skills and (2) obtains their grade point averages (two dependent variables) to see whether the program had an effect.

Each of these examples includes treatment groups that are recipients of a particular intervention. The third example also includes two control groups: one that receives no intervention and another that receives a *placebo* intervention that's unlikely to affect the dependent variable(s) in question. In many experimental studies, participants are assigned to groups *randomly*—for instance, by drawing names out of a hat or having computer software randomly pick different participants for different groups. Such random assignment is apt to yield groups that are, on average, roughly equivalent on other variables (preexisting ability levels, personality characteristics, motivation, etc.) that might affect the dependent variable.

Random assignment to groups isn't always possible or practical, however, especially in research studies conducted in actual schools and classrooms. For example, when studying the potential benefits of a new teaching technique or therapeutic intervention, a researcher may not be able to completely control which students receive the experimental treatment and which do not, *or a* particular treatment or intervention may have important benefits for *all* students. In such situations, researchers often conduct a quasi-experimental study, in which they take into account, but don't completely control, other influential factors. The following are examples:

- A researcher implements a new after-school homework program at one high school and identifies a comparable high school without such a program to serve as a control group. The researcher obtains achievement test data for students at both schools both before and after the program's implementation. Ideally, to document the homework program's effectiveness, the average test scores for the two high schools should be the same *before* the program begins. Then, if differences exist at the end of the program, they may be attributed to the new homework program.

- A team of researchers wants to study the effects of safety instructions on children's behaviors on the playground. The researchers present the instructional intervention to first graders one week, second graders the following week, and kindergartners and third graders the week after that. The researchers monitor students' playground behavior before, during, and after the intervention to determine whether each grade-level group's risky playground behavior decreases immediately following the intervention.[14]

When researchers conduct such quasi-experimental studies, they don't control for all potentially influential variables and therefore can't completely rule out alternative explanations for the results they obtain. For instance, in the after-school homework program example, possibly the school getting the new homework program—but *only* that school—has simultaneously begun to use more effective instructional methods during the school day, and those methods are the reason for any increase in achievement scores. And in the playground safety example, perhaps certain other things coincidentally happened in the four classrooms during their respective safety-instructions weeks, and those things were the true causes of children's behavior improvements.

When carefully designed and conducted, experimental studies and, to a lesser degree, quasi-experimental studies enable us to draw conclusions about *causation*—about *why* behaviors occur. Yet for practical or ethical reasons, many important questions in education don't easily lend themselves to experimental manipulation and tight control of other potentially influential variables. For example, although we might find a correlation between children's aggression levels at school and the amount of violence in their home environments, it would be highly unethical to conduct an experimental study in which some children are intentionally placed in a violent environment. Consequently, some important educational questions can be addressed only with descriptive or correlational studies, even though such studies don't let us pin down precise cause-and-effect relationships.

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[14] Here we're describing a study conducted by Heck, Collins, and Peterson (2001).

Drawing conclusions about cause-and-effect relationships requires that all other possible explanations for an outcome be eliminated.

Whenever we look at the results of a research study—regardless of who has conducted the study and regardless of whether it has been described in a professional journal or other credible media source—we mustn't be too hasty to draw conclusions about cause-and-effect relationships. As an example, imagine that Hometown School District wants to find out which of two new reading programs, *Reading Is Great* (RIG) or *Reading and You* (RAY), leads to better reading in third grade. The district asks each of its third-grade teachers to choose one of these two reading programs and use it throughout the school year. The district then compares the end-of-year achievement test scores of students in the RIG and RAY classrooms and finds that RIG students have gotten substantially higher reading comprehension scores than RAY students. We might quickly jump to the conclusion that RIG promotes better reading comprehension than RAY—in other words, that a cause-and-effect relationship exists between instructional method and reading comprehension. But is this really so?

Not necessarily. If we look at the study more closely, we realize that the school district hasn't eliminated all other possible explanations for the difference in students' reading comprehension scores. Remember, the third-grade teachers personally *chose* the instructional program they used. Why did some teachers choose RIG and others choose RAY? Were these two groups of teachers different in some way? Had RIG teachers taken more advanced courses in reading instruction, were they more open-minded and enthusiastic about using innovative methods, or did they devote more class time to reading instruction? Or, did the RIG teachers have students who were, on average, better readers to begin with? If the RIG and RAY classes were different from each other in any of these ways—or perhaps different in some other way we haven't thought of—then the district hasn't eliminated alternative explanations for why the RIG students have outperformed the RAY students. A better way to study the causal influence of reading program on reading comprehension would be to *randomly assign* third-grade classes to the RIG and RAY programs, thereby making the two groups similar (on average) in terms of student abilities and teacher characteristics.

Be careful that you don't jump to conclusions too quickly about what factors are affecting students' learning, development, and behavior in particular situations. You should scrutinize research reports carefully, always with these questions in mind: *Have the researchers separated and controlled variables that might have an influence on the outcome? Have they ruled out other possible explanations for their results?* Only when the answers to both of these questions are undeniably *yes* should you draw a conclusion about a cause-and-effect relationship.

Principles and theories can help synthesize, explain, and apply research findings.

The large body of educational psychology research is more useful to teachers when it's organized into principles and theories. **Principles** describe the specific effects of certain factors on other factors or outcomes, such as those related to learning, development, and behavior. Consider this research-based principle: Students are likely to learn more when they are interested in what they are learning. The influential or "potentially causal" factor in this principle is *interest,* which has an effect on students' *learning.* Teachers at any grade level and subject area can use this principle in a variety of ways. For example, when teaching about a particular war—say, about the American Civil War or the French Revolution—a social studies teacher could select readings with interesting storylines about specific historical figures to pique students' interest as a way of enhancing their learning.

Whereas principles tell us *what* factors are important, theories tell us *why* these factors are important. A **theory** is an integrated set of concepts and principles developed to explain the underlying mechanisms of a phenomenon. Because human functioning is so complex, there is no one "mega-theory" in educational psychology to explain all of our thoughts, behaviors, and feelings. Instead, there are many smaller theories that explain various aspects of human functioning. For example, in Chapter 2 we'll discover that one prominent theory of how people learn—information processing theory—proposes that attention is an essential ingredient in the learning process. If a learner doesn't pay attention, information rapidly disappears from memory; in the words of a

popular expression, the information goes "in one ear and out the other." The importance of attention in information processing theory suggests that strategies that capture and maintain students' attention are apt to enhance students' learning. Therefore, information processing theory could explain why students are likely to learn more when they're interested in what they're learning: they pay attention more closely to what they're supposed to be learning.

Sometimes people use the word *theory* to mean a guess, hunch, or an untested hypothesis. An example would be someone who says, "I have a theory about why he doesn't want to see her anymore." However, educational psychologists build theories over time based on evidence, not purely on speculation. Even so, theories continue to change as new research methods are devised, new research is conducted, and new research findings come to light. In contrast, principles tend to be fairly stable over time.

Although current theories may undergo modifications in the future, they can still be quite useful even in their unfinished forms. They help us integrate thousands of research studies into concise understandings of how children typically learn and develop, and they enable us to make reasonable estimates about how students are likely to perform and achieve in particular classroom contexts. In general, then, theories can help us both *explain* and *predict* human behavior, and so they give us numerous ideas about how best to help students achieve academic and social success at school. In fact, we have organized this book by grouping similar principles and theories together into *Big Ideas* to help you more easily understand the findings from many research studies.

Teachers need to use evidence-based practices that are consistent with effective teaching principles and theories, including those developed by educational psychologists. As teachers use research findings to inform their instructional decisions, they need to be critical consumers of research and examine the design of studies to ensure that the conclusions drawn are appropriate. In the hotlinked Self-Check quiz and Application Exercise that follow, you can check and apply your understandings related to Big Idea 1.1:

> *Effective teachers use research findings and research-based theories to make decisions about instructional strategies, classroom management, and assessment practices.*

MyEdLab **Self-Check 1.1**

MyEdLab **Application Exercise 1.1.** In this exercise, you can practice classifying different types of research studies and identifying the kinds of conclusions that might reasonably be drawn from the results of the studies.

1.2 DEVELOPING AS A TEACHER

Big Idea 1.2 Effective teachers continually work to enhance their professional knowledge and skills.

If you are currently enrolled in a teacher education program, you should think of your program as a good start on the road to becoming a skillful teacher.[15] It's *only* a start, however. True expertise in any profession, including teaching, takes many years of experience to acquire, although even a single year of teaching experience can make a significant difference.[16] So be patient with yourself, and recognize that occasionally feeling a bit unsure and making mistakes is not unusual. As you gain experience, you'll gradually become able to make decisions about routine situations and problems more quickly and efficiently, giving you time and energy to think creatively and flexibly about how best to teach classroom subject matter.[17] Here we offer several strategies to develop your knowledge and skills as a teacher—all of them based on research on teacher effectiveness.

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[15] Bransford, Darling-Hammond, & LePage, 2005; Brouwer & Korthagen, 2005.

[16] P. A. Alexander, 2003; Berliner, 2001; Clotfelter, Ladd, & Vigdor, 2007; Henry, Bastian, & Fortner, 2011.

[17] Borko & Putnam, 1996; Bransford, Derry, Berliner, & Hammerness, 2005; Feldon, 2007.

Keep up to date on research findings and innovative evidence-based practices in education.

Occasional university coursework and in-service training sessions are two good ways to enhance teaching effectiveness.[18] Also, effective teachers typically subscribe to one or more professional journals, and as time allows, they attend professional conferences in their region. Many websites provide teachers with information and ideas about effective classroom practices, including the websites of professional organizations, such as the National Council of Teachers of Mathematics (www.nctm.org), the National Council for the Social Studies (www.socialstudies.org), the National Association for Music Education (www.nafme.org), the National Science Teachers Association (www.nsta.org), and the International Literacy Association (www.literacyworldwide.org).

Learn as much as you can about the subject matter you teach, about teaching strategies, and about learners and their development.

Effective teachers typically know their subject matter extremely well and can usually anticipate—and thus can also address—the difficulties students will have and the kinds of errors students will make in the process of mastering a certain skill or body of knowledge.[19] Effective teachers also know a variety of teaching strategies, including strategies for teaching particular topics and skills—strategies collectively known as pedagogical content knowledge.[20] In addition, effective teachers have knowledge of learners and their development in social contexts, which is why it's important for teachers to understand concepts related to educational psychology.[21]

With subject-matter knowledge, knowledge of teaching strategies, and knowledge of learners, teachers have the knowledge required to design and implement instruction that meets students' needs (see Figure 1.4). To meet the needs of *all* their students, teachers must be prepared to teach students with a wide variety of special needs in their classrooms. These students with special needs are different enough from their peers that they require specially adapted instructional materials or practices to help them maximize their learning and development. Many of these students are included in general education classrooms, a practice called inclusion. At several points in the book we'll consider students with particular kinds of special needs and identify strategies that may be especially useful in working with them.

FIGURE 1.4 Effective teachers draw on many types of knowledge when making decisions in the classroom.
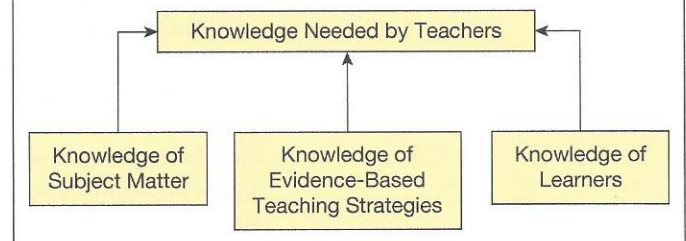
Learn as much as you can about the culture(s) of the community in which you are working.

In Cultural Considerations boxes throughout the book, you'll see numerous ways in which children from diverse cultural groups may think and behave differently than *you* did as a child. But a textbook can offer only a sampling of the many cultural differences you might encounter. You can become more informed about students' cultural beliefs and practices if you participate in local community activities and converse frequently with parents and other community members.[22]

Continually reflect on and critically examine your assumptions, inferences, and teaching practices.

In the opening case study, Anne Smith reflects on her students' performance in previous years and then institutes new assessment policies that might be more motivating and productive. Like Ms. Smith, effective teachers engage in reflective teaching: They continually examine and critique

[18] Desimone, 2009; Guskey & Sparks, 2002; Hamre et al., 2012; Hattie, 2009.
[19] Borko & Putnam, 1996; Cochran & Jones, 1998; H. C. Hill et al., 2008; D. C. Smith & Neale, 1991; Windschitl, 2002.
[20] Baumert et al., 2010; Cochran & Jones, 1998; Krauss et al., 2008; Shulman, 1986.
[21] Bransford, Darling-Hammond, & LePage, 2005.
[22] Castagno & Brayboy, 2008; McIntyre, 2010; Rogoff, 2003.

their assumptions, inferences, and instructional practices, and they regularly adjust their beliefs and strategies in light of new evidence.[23]

Communicate and collaborate with colleagues.

Good teachers rarely work in isolation. Instead they frequently communicate with colleagues in their own school district and across the nation—perhaps with colleagues in other countries as well—through face-to-face meetings, e-mail, regional or national conferences, and professional websites (e.g., www.oercommons.org). Ideally, teachers and administrators at a single school create a professional learning community, in which they share a common vision for students' learning and achievement, work collaboratively to achieve desired outcomes for all students, and regularly communicate with one another about their strategies and progress.[24] Most experienced teachers are happy to offer beginning teachers advice and support during challenging times. In fact, they're apt to be flattered to be asked!

Believe that you can make a difference in students' lives.

In Chapter 5 you'll discover the importance of having high self-efficacy—that is, of believing that you're capable of executing certain behaviors or reaching certain goals. Students are more likely to try to learn something if they believe they *can* learn it—in other words, if they have high self-efficacy. But teachers, too, must have high self-efficacy about what they can accomplish. Students who achieve at high levels are apt to be those whose teachers have confidence in what they, *as teachers,* can do—both individually and collectively—for their students.[25] Ultimately, what teachers do in the classroom *matters* for students, not only in the short term but for years to come.[26]

Integrate action research into your ongoing classroom practices.

Like Anne Smith in the opening case study, practicing teachers sometimes have questions that existing research findings don't fully answer. In action research, teachers conduct systematic studies of issues and problems in their own schools, with the goal of seeking more effective strategies for working with students. For example, an action research project might involve examining the effectiveness of a new teaching technique, seeking students' opinions on a new classroom policy (as Ms. Smith does), or ascertaining reasons why many students rarely complete homework assignments.

Action research studies typically involve the following steps:[27]

1. *Identify an area of focus.* The teacher-researcher begins with a problem and gathers preliminary information that might shed light on the problem, perhaps by reading relevant books or journal articles, searching the Internet, or discussing the issue with colleagues or students. The teacher-researcher then identifies one or more specific questions to address and develops a research plan for answering those questions (data-collection techniques, necessary resources, schedule, etc.). At this point, the teacher also seeks permission to conduct the study from school administrators and any other appropriate authorities. Depending on the nature of the study, parents' permission may be necessary.

2. *Collect data.* The teacher-researcher collects data relevant to the research questions. Such data might, for example, be obtained from questionnaires, interviews, achievement tests, students' journals or portfolios, existing school records (e.g., attendance patterns, school suspension rates), observations, or any combination of these.

3. *Analyze and interpret the data.* The teacher-researcher looks for patterns in the data. Sometimes the analysis involves computing particular statistics (e.g., percentages, averages, correlation coefficients), which would make it a quantitative study. At other times the analysis involves

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[23] Hammerness, Darling-Hammond, & Bransford, 2005; T. Hogan, Rabinowitz, & Craven, 2003; Larrivee, 2006.

[24] DuFour, DuFour, & Eaker, 2008; P. Graham & Ferriter, 2009; Raudenbush, 2009.

[25] Holzberger, Philipp, & Kunter, 2013; J. A. Langer, 2000; Skaalvik & Skaalvik, 2008.

[26] Hattie, 2009; Konstantopoulos & Chung, 2011.

[27] Steps based on those recommended by Mills (2014).

an in-depth, nonnumeric inspection of the data, which would make it a qualitative study. Or, it could be a combination of both quantitative and qualitative data, which would make it a mixed methods study. The teacher-researcher then relates the findings to the original research questions.

4. *Develop and implement an action plan.* The final step distinguishes action research from the more traditional research studies described earlier. In particular, the teacher-researcher uses the information collected to *take action*—for instance, to change instructional strategies, school policies, or the classroom environment.

After the final step, a teacher-researcher may have all the information that he or she needs to work more effectively with students. Or, he or she may want to go through the process again by collecting more data, analyzing and interpreting the data, and developing and implementing another action plan. This cyclical process is shown in Figure 1.5 and could continue over and over.

FIGURE 1.5 The steps involved in an action research project
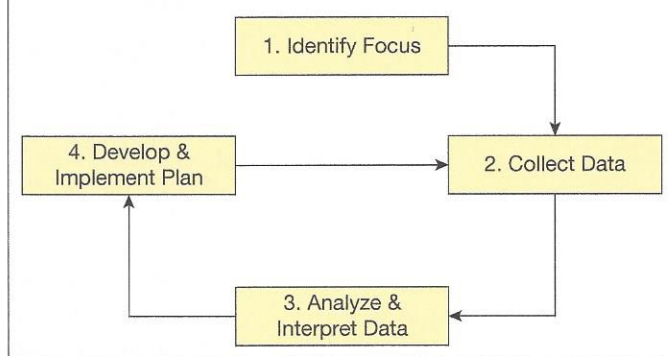
Teachers can become more effective over time if they intentionally use strategies to increase their knowledge and skills. Teachers can develop their teaching skills by gaining knowledge, learning about students' cultures, reflecting on their beliefs and practices, communicating with colleagues, believing that they can influence students, and conducting action research. In the hotlinked Self-Check quiz and Application Exercise that follow, you can check and apply your understandings related to Big Idea 1.2:

> *Effective teachers continually work to enhance their professional knowledge and skills.*

MyEdLab **Self-Check 1.2**

MyEdLab **Application Exercise 1.2.** In this exercise, you will hear how a teacher selected an area of focus for her action research project. Then, you will describe the types of data that the teacher could collect to answer her research question.

1.3 STRATEGIES FOR LEARNING AND STUDYING EFFECTIVELY

Big Idea 1.3 Learners read, study, and learn more efficiently when they plan appropriately and use effective strategies.

This book includes many features that will, we hope, help you read about, study, and apply what researchers and experienced educators have learned about learning, development, motivation, and effective classroom practices. For example, each chapter begins with a few Big Ideas that capture the chapter's underlying themes. Each chapter also presents its major premises (guiding principles) and recommendations (key strategies) as boldfaced headings. In addition, the opening case studies and the figures, tables, exercises, concrete examples, margin questions, and application exercises interspersed throughout the book are all designed to enhance your understanding and memory of what you're reading.

Yet ultimately, how much you learn from the book is up to you. In upcoming chapters you'll learn a great deal about how human beings—including *you*—typically think about, learn, and remember new ideas. We're optimistic that you'll become a better student after reading those chapters, but in the meantime, here are some general strategies you can use as you read and study.[18]

Before you study, prepare for your study session.

When you're busy, it's tempting to rush into a study session without much planning. But you will find that you can make more effective use of your time if you plan your study sessions using these strategies:

- *Study at times when you're mentally alert.* Are you a "morning person"? A "night owl"? Identify the times you can most effectively study and then use these times for studying. You probably don't need to be as alert when you're running errands, checking social media, or doing your laundry, so save those tasks for when you're feeling less alert.

- *Select an appropriate environment for studying.* Don't underestimate the importance of selecting a place to study where you can concentrate. Find somewhere that's free of distractions. For example, you might need to leave your iPad in another room, turn off your phone, tell others not to disturb you, or go to a coffee shop if you can concentrate better there. Things that distract you might not distract others, so figure out what's best for you.

- *Be realistic about how much you can effectively learn and remember at any one time.* As you'll discover in Chapter 2, our brains only allow us to think about and learn a limited amount of information in a short amount of time. Plan ahead and divide lengthy learning activities into smaller chunks you can spread out over several days. And certainly don't leave an entire book chapter until the last minute!

- *Set goals for each study session.* Decide what you want to accomplish during a study session, and structure the session in a way that allows you to meet your goals. In Chapter 3, you will learn that setting goals can help you to monitor your learning and stay focused on what's important. Sometimes you won't meet all your goals for a study session because something you need to do takes longer than planned—that's not unusual. But with time and experience, you should become better able to set and accomplish realistic goals for each of your courses, which will allow you to plan your days, weeks, and even months more effectively.

During your study session, use effective study strategies.

Of course what you do *during* your study sessions significantly affects how much you will learn and remember. Here are some study strategies that can help you study more effectively:

- *Pay attention to what you're studying.* You need to be mentally active when you study if you want to remember what you're studying. If your mind starts to drift or you get sleepy, very little of what you are "studying" is likely to stay with you. If you're too tired, maybe you need to take a 5-minute break to do something that requires less attention. Or quit and come back again when you're more rested and less distracted.

- *Relate new information to your existing knowledge and prior experiences.* Think about how new ideas are consistent with your personal experiences, knowledge, and beliefs, as well as with things you've learned in other courses. You can even actively consider how some new information might contradict your existing experiences, knowledge, or beliefs. As the earlier OOPS test may have shown you, some of what you currently "know" and believe may be sort-of-but-not-quite accurate or even downright *inaccurate*. People's existing beliefs can occasionally wreak havoc with new learning. For example, many students in teacher education classes adamantly reject research findings that appear to be inconsistent with their personal beliefs and experiences.[29] When you encounter puzzling or seemingly "wrong" ideas and findings, try to keep an open mind and consider how and why they might have some merit. Truly effective learners occasionally undergo *conceptual change,* revising their current understandings and beliefs in light of new and trustworthy evidence.

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[29] Fives & Gill, 2015; Gregoire, 2003; Richardson, 2003.

- *Organize the new information.* Organizing information requires you to actively consider how various pieces of information are related. You can categorize related information together using outlines or diagrams. If the information includes cause-and-effect relationships, you can show these relationships, either through explanations or graphically using symbols and/or arrows.

- *Use visual imagery.* A picture may be worth 1,000 words. Form mental pictures of objects and ideas to aid in your memory of the information. You can also create pictures, diagrams, or other graphics to help you capture the meaning of the information.

- *Elaborate on what you read, going beyond it and adding to it.* As you learned earlier in this chapter, elaboration involves embellishing on new information in some way. So try to think beyond the things you read. Draw inferences from the ideas presented. Generate new examples of concepts. Identify your own educational applications of various principles of learning, development, and motivation. You will be more likely to understand and remember abstract information when you tie it to concrete objects and events. In this book, we try to help you do this by providing case studies and short examples that involve real children and teachers. We also include links to videos that depict classrooms in action and *See for Yourself* exercises such as the OOPS test—all of which can enhance your understanding and memory of new concepts and help you recognize them when you see them in your own work with children and adolescents.

- *Periodically check yourself to make sure you remember and understand what you have read.* To check your comprehension, try to summarize the material and ask yourself questions about it to ensure everything makes sense to you. Try to explain difficult concepts to someone who doesn't understand them.

After your study session, review what you studied.

What you do before and during your study sessions is important, but what you do *after* your study sessions can also help you to learn and remember information over the long term. Here are a couple suggestions:

- *Schedule time to review what you studied previously.* Research is clear on this point: Periodic review of previously learned material definitely helps students remember it more effectively and accurately. So make time in your schedule for review sessions in the days and weeks after your study sessions.

- *Quickly review what you learned previously.* The point of the review sessions is to review, not to redo what you did in your last study session; therefore, these sessions can be short. Simply remind yourself of the important points and clarify any misunderstandings. Review sessions can even occur immediately prior to a new study session and may help you better assimilate the new information with what you've already learned.

> To study and learn most effectively, you need to prepare for your study sessions by ensuring that you're mentally alert and setting goals for yourself. During the study session, you should use effective study strategies, such as organizing information, using visual imagery, and elaborating on the information. And after your study session, you should have a plan for when you will review the information again. In the hotlinked Self-Check quiz and Application Exercise that follow, you can check and apply your understandings related to Big Idea 1.3:
>
> *Learners read, study, and learn more efficiently when they plan appropriately and use effective strategies.*
>
> MyEdLab **Self-Check 1.3**
>
> MyEdLab **Application Exercise 1.3.** In this exercise, you will read scenarios about students and make suggestions for strategies they can use to improve their learning.

think about it
How often do you elaborate while reading your textbooks? Do you learn and remember information more effectively when you elaborate on what you're reading?