



©iStockphoto.com/pablohart

1

INTRODUCTION TO RESEARCH

LEARNING OBJECTIVES

Upon completion of this chapters, students should be able to

- 1.1 Explain the benefits and characteristics of educational research
- 1.2 Construct the steps of the scientific method in conducting research
- 1.3 Differentiate between the approaches of basic research and applied research
- 1.4 Elaborate on how self-regulated learning can help educators become educator—researchers
- 1.5 Consider key logistical constraints and diversity, equity, and inclusion considerations in conducting research
- 1.6 Demonstrate knowledge of ethical issues when conducting research on human subjects
- 1.7 Identify the various content features in the individual chapters of this book

A DAY AT WORK

Helping Struggling Students Succeed!



Educational research can help educators use effective approaches to instruction.

©iStockphoto.com/SDI Productions

Mr. Hibachi and Ms. Pérez were just hired as fifth-grade teachers in an urban elementary school for students who consistently struggle and achieve poor performance scores on their report cards and on the state’s standardized tests. Both teachers previously taught

for several years, and each of them is confident their approach to teaching works well—although they differ widely from one another. Mr. Hibachi prefers a more student-centered approach called *constructivism*, whereby students work together in groups to problem-solve and construct their own knowledge with minimal talking or interfering from the teacher. Ms. Pérez prefers a more traditional approach called *direct instruction*, whereby she lectures or disseminates knowledge to students. They then work on small group activities or on worksheets on their own at their desks. However, after speaking with Mr. Hibachi, Ms. Pérez is beginning to have second thoughts about which instructional approach to take—although Ms. Pérez is confident that she can help her students learn and succeed if she identifies the best approach for them! How does one know whether the instructional approach one is using is most effective? Reading and/or conducting educational research can help provide Ms. Pérez with the answers to these and other questions.

INTRODUCTION

Educators often do not visualize themselves as researchers. Research is frequently viewed as the work of university faculty or scientists trying to solve a broad array of problems. But what educators may not realize is that it is possible to conduct research, and doing so can be extremely rewarding and beneficial to one's work as an educator!

In this chapter, we provide an overview of the benefits and characteristics of educational research and the common approaches to conducting educational research. We explain the steps of the scientific method using examples of critical issues of practice and discuss the role of self-regulated learning in helping educators learn how to conduct research. Following our discussion of self-regulated learning, we discuss key logistical constraints and diversity, equity, and inclusion considerations in conducting research. We then discuss ethical considerations in conducting research followed by a brief description of each chapter in the textbook. As you read this chapter and subsequent chapters, try to envision yourself as an educator who is not only capable of conducting research, but one who can use research to make school contexts a more productive, positive, and effective place to learn and work.

THE IMPORTANCE OF EDUCATIONAL RESEARCH

LEARNING OBJECTIVE

- 1.1 Explain the benefits and characteristics of educational research.

Educational research is a process that involves the organized or systematic collection of information to examine teaching and student learning. Educational research may include simple and straightforward activities, such as reviewing the literature on a specific topic, or more complex activities, such as conducting a true experiment on the use of a new instructional approach. While some educators may be excited about taking a research methods class, many are apprehensive about taking courses titled Research Methods. Educators often associate research methods courses with statistics or mathematics and worry the content will be difficult to understand. In our direct interactions with pre-service teachers or administrators, we have even heard teacher candidates or preservice school administrators talk about how they did not see the importance of educational research, stating that their goals are to teach or work in schools not conduct research! But educational research has taken on increased importance in recent years due to the many

complex and challenging situations educators encounter, as well as the need for data-driven decision making in schools. It is imperative for practitioners to understand educational research to make informed decisions about problems they are facing in the classroom, school, and beyond.



Educational research can help educators solve critical problems, such as alleviating test anxiety among students, narrowing the achievement gap, and improving student retention.

©iStockphoto.com/GoodLifeStudio

Benefits of Conducting Educational Research

Before we describe the benefits of conducting research, we would like to emphasize that we use the term *educator* throughout this book in a broad sense include teachers, school counselors, special education educators, psychologists, and administrators. There are several direct benefits to educators at all expertise levels to conducting research, such as providing solutions to problems directly related to practice, solving more broadly defined critical problems, and informing policy decisions and procedures.

Educational research can assist educators in addressing critical issues of practice by helping them learn about new ways to problem-solve and novel approaches that can enrich their experiences and performance as educators. By learning about educational research or even conducting their own research, educators can also gain an understanding about the causes of various problems and reflect upon best practices. For example, if Ms. Pérez conducted research to identify an instructional approach that best supports students who are struggling to perform well on biweekly exams to, she may be able to refine her teaching so that it ultimately has a positive and significant impact on students' achievement outcomes. A larger scale research-to-practice application could involve a national study on middle-school students' science achievement and using that data to change curriculum and instructional practices across the country.

An additional reason that educational research is beneficial is that it can be used to solve more broad critical problems. Critical problems usually extend beyond the scope of a classroom and include situations that have not been studied before. For example, Dr. Corvino is headmaster of a high school that consists of students who have been diagnosed with neurodiverse

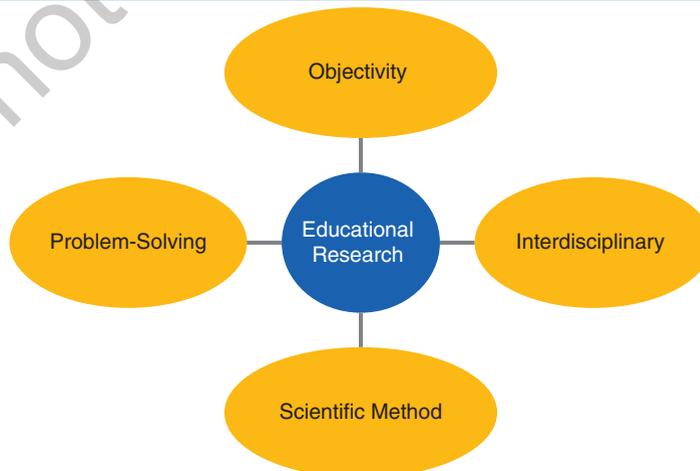
conditions. She has become increasingly concerned about student morale and its potential effects on attendance, learning, and participation in extracurricular activities. After searching through the literature, Dr. Corvino realized that minimal research has been conducted on student morale in schools similar to her own, and she decided to conduct a research study with her former university professor from her education program. This type of research can provide educators with strategies and solutions to problems that otherwise might not seem solvable.

The third benefit of educational research is that it can be used to inform policy decisions and procedures. Educational research can provide information to government and local officials, school boards, administrators, and other relevant stakeholders to help make evidence-based decisions about education. By relying on findings from educational research, policy decisions can be made that are grounded in empirical evidence and data rather than merely opinions, stories, or subjective experiences. For example, superintendents may conduct research on whether providing students with annual programs on substance abuse can help reduce drug and alcohol use among teenagers within the schools in their districts. Administrators or school board members may have suggestions or ideas on how to reduce substance abuse, but unless these suggestions are backed by scientific evidence, it is unlikely they will be implemented, financially supported, or enforced as part of a new policy. In sum, educational research can help educators become more effective practitioners by providing them with useful insights and information that may be incorporated into their work. But what exactly is meant by research methods and what are some of the characteristics of educational research?

Characteristics of Educational Research

A big part of being an educator involves reflecting on issues related to one's profession. Throughout this book, we will describe scenarios where the educators reflect about different problematic topics and think through and identify potential solutions. Educational research typically begins with first identifying a problem or a critical issue and then conducting a literature review to develop research questions and/or hypotheses. Researchers would then collect, analyze, and interpret the data, and then finally provide written or verbal communication of the results. **Research methods** refers to specific procedures for collecting and analyzing data to provide information or uncover a new finding. We describe four characteristics of educational research that help explain this definition in greater detail (Figure 1.1).

FIGURE 1.1 ■ Characteristics of Educational Research



The first characteristic of educational research is that it usually sets out to solve a specific problem. For example, in our opening scenario, Ms. Pérez was preparing for her first year of teaching and wanted to provide her students with the opportunity to achieve the best possible outcomes. In addition to Ms. Pérez figuring out which teaching approach to use, there are a multitude of concerns that educators may encounter—such as school safety, faculty motivation, cyberbullying, standardizing curriculum, high-stakes testing, student diversity, and student connectedness and resilience. Conducting research can help guide decision-making and the use of problem-solving strategies that would not have been available otherwise.

A second characteristic of educational research is objectivity, or an unbiased view of things. In subsequent chapters, we delve into the different research methodologies and designs for conducting research; however, regardless of which methodology or design one chooses, it is critical for researchers to be objective in every aspect of the research process. Maintaining objectivity can be challenging when researchers have implicit biases that naturally and unintentionally skew the collection, analyses, and interpretation of data. It is necessary for educators who are conducting research to reflect on their biases and to remain objective or impartial and to focus on the facts in conducting research.

A third characteristic of educational research is that it tends to be interdisciplinary. While conducting educational research on a specific educational problem can appear straightforward, addressing that problem can also draw from multiple perspectives and disciplines. For example, if Ms. Pérez were to conduct some preliminary research on effective instructional strategies for fifth-grade students who struggle academically, she would likely find journal articles that are discipline specific—such as teaching mathematics, English, or history. However, in doing so, she would also likely come across research on instructional approaches that are specific to special education or neurodiverse students.

The fourth characteristic of educational research is that it is grounded in the scientific method. The scientific method is essential for conducting research and thus is used by scientists and educators alike. We detail the scientific method in the following section given its central role in most educational research.

THE TAKEAWAY

Educational research and its characteristics are essential to educators to help them with problem-solving and difficult issues of practice.

RESEARCH AS A SCIENTIFIC METHOD

LEARNING OBJECTIVE

1.2 Construct the steps of the scientific method in conducting research.

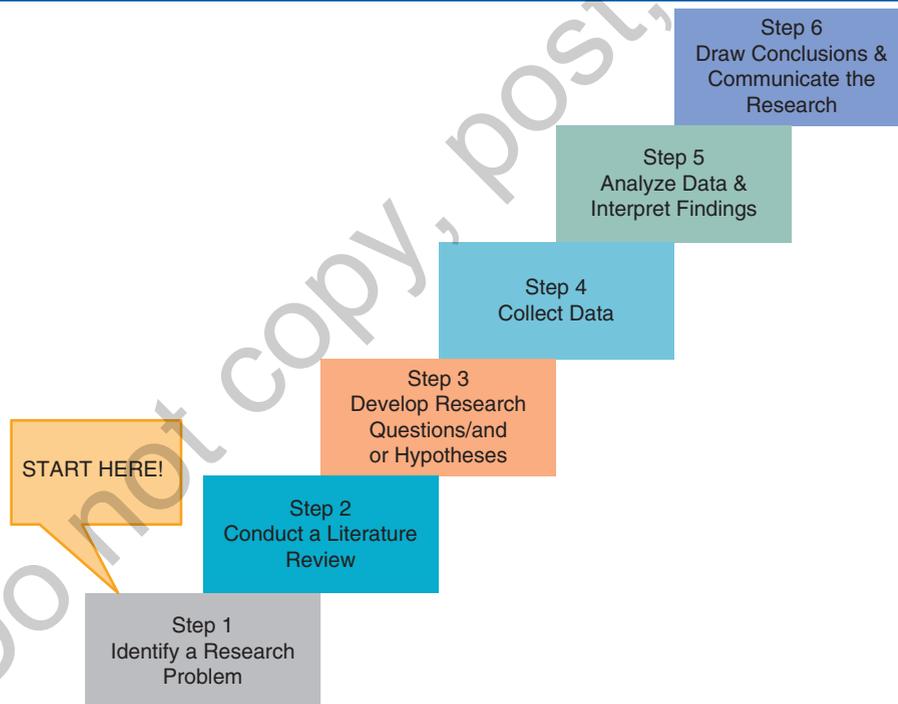
Many of us learned about the scientific method in high school or earlier grades. The **scientific method** is a dynamic process that helps researchers conduct research by following six distinct steps. One may think the scientific method only applies to scientists or students conducting experiments in science classes; however, the scientific method is naturally intertwined with

educational research in that it provides an objective systematic framework that can be followed and replicated. Most educators, which include teachers, school psychologists, school social workers, school therapists (i.e., speech and physical therapists), and administrators, can act and think like scientists as they problem-solve and make decisions about their work or address concerns in the school community. Even when not fully aware of it, educators are constantly reflecting, questioning, assessing, and evaluating in ways that mirror the research activities of scientists.

The use of the scientific method provides a systematic approach for scientific inquiry. Many education programs require a course in research methods because it is important for students to learn about the power and value of conducting research and using the research literature to enhance their work as educators.

Learning how to conduct research and understanding how to critically evaluate published research are professional responsibilities of all educators. In conducting research, educators may decide to collaborate with colleagues, administrators, university faculty, or stakeholders. When conducting research, educators take on two distinct roles: scientist and educator. These two roles provide educators with the power to improve problems of practice and create transformative changes in themselves and others. The six steps to the scientific method as outlined in Figure 1.2 consist of identifying a research problem, reviewing the literature, developing hypotheses, collecting data, analyzing and interpreting the data, and drawing conclusions and communicating the research. This framework provides educators with a systematic approach to conducting research.

FIGURE 1.2 ■ Steps of the Scientific Method



Identifying a Research Problem

The scientific method begins with the identification of a critical issue or problem in education that needs to be resolved. The research problem provides direction, purpose, and structure for the remaining steps of the scientific method. Research problems may be identified by focusing on

aspects of a particular theory (for example, testing a statement of a theory), the desire to replicate previous studies, or by one's personal experiences. The research problem should be a critical issue that can be investigated via research; realistic in terms of available time, resources, and skills; and it must be ethical. For example, in terms of a realistic research problem it would be much more manageable and doable for Ms. Pérez to study two types of instructional approaches (constructivist instruction versus direct instruction) across all fifth graders in her school district rather than many different instructional approaches one could use to teach K–6 students nationally.

Once educators have identified a problem, they need to articulate a statement of the problem that includes a description of the key constructs and characteristics of the participants. A statement of the problem refers to an explanation of the problem that one would like to investigate and is written as a declarative statement or as a question. These statements can range from a few sentences to several paragraphs and should include an explanation of the research problem, your claim or position on the issue, and a rationale for the significance of the study.

The statement of the problem helps to guide the development of **research questions**. A research question is a question about some aspect of your problem that you want to explore or understand. Research questions are explained in further detail in Chapter 2, where we discuss the key components to writing a research question. In our opening scenario, Ms. Pérez knows the students in her school struggle academically, and she has questions about which teaching approach is most effective given the characteristics of these students. In the *Let's See It!* activity, we provide examples of a statement of the problem and research questions using Ms. Pérez's interest in instructional approaches. Following the *Let's See It!* is a practice opportunity for you in the *Let's Do It!* Keep in mind that the intention of this activity is to help you to begin thinking like a researcher, and we do not expect you to write perfect research questions since we have not yet described the important elements of a writing a good research question. That will come in Chapter 2!

Let's See It! 1.1

Goal: Understand How to Write a Statement of the Problem and Research Questions

Directions: Review the statement of the problem and the sample examples of research questions.

Statement of the problem: Many fifth graders perform poorly in school and on standardized tests. Fifth grade is a critical year for students, as it is the last grade one takes before entering middle school. Research on which instructional approach (constructivist or direct instruction) to use for students who struggle academically is important because the findings can help educators best support their students' achievement. Success in fifth grade can lead to access to high-performing middle school placement that can ultimately lead to entrance to competitive high schools, thus providing the foundation for admission to more competitive colleges. Therefore, fifth-grade performance can possibly impact the future of these learners.

Examples of Research Questions

- Which instructional approach (i.e., constructivist versus direct instruction) will result in higher achievement on standardized test scores for fifth-grade students who are struggling academically?
- Will there be a difference in student achievement on standardized tests' scores depending on which instructional approach they receive (i.e., constructivist versus direct instruction)?

Let's Do It! 1.1**Guided Practice: To Practice Writing a Statement of the Problem and Research Questions**

Directions: Imagine you are a principal of a rural elementary school and have been asked by the superintendent to separate all boys from girls for instructional purposes because the superintendent believes students will be less distracted from one another, which will ultimately lead to greater student achievement. Imagine that you do not agree with this approach and, along with several of your colleagues, believe it can be detrimental to students' achievement and socioemotional development to separate boys and girls throughout the day.

Write a statement of the problem as you see it and then describe a couple of research questions you might ask if you were going to conduct a study on this.

Statement of the Problem

Examples of Research Questions

Now that you have completed the *Let's See It!* and the *Let's Do It!* activities, you can independently practice these skills further by completing the *You Do It!* exercise included at the end of the chapter. In that exercise, we ask you to identify a critical problem in education that is of concern to you and then to write the statement of the problem and potential research questions you would seek to have answered.

Reviewing the Literature

Conducting a literature review is the second step in the scientific method, and involves searching databases to identify, review, and synthesize findings from published journal articles, books, and other relevant publications. When conducting a literature review, researchers may discover that research has already been done on this topic, or they may uncover variables not previously considered. The process of conducting a literature review is also discussed in greater detail in Chapter 2, as a critical step in the scientific method that can help researchers fine-tune their research questions and/or formulate hypotheses. It can also provide researchers with information about relevant theories on the topic, which helps to make a stronger rationale and explanation for conducting a particular research study.

STOP AND THINK 1.1

Describe an example of a critical issue related to education that you could search for on Google? Conducting a literature review is a more scientific approach to searching for answers!

Formulating Research Questions and/or Hypotheses

Educators conducting research will often reflect and think about the concerns they have about critical issues they experience or have observed in schools. These reflections often help to formulate research questions that depending on the methodological approach might lead to hypotheses for their study. A **hypothesis** is a stated belief about the relationship between two or more variables or a proposed explanation stemming from observations and a literature review. It is an essential component of the scientific method because it provides the standards against which researchers evaluate and interpret their results. To formulate a hypothesis, the researcher specifies the relevant variables and the potential relationships among them.

Hypotheses can make predictions about expected outcomes. In many cases, researchers seek to draw a conclusion about the presence of a real effect or relationship among variables. Researchers may also formulate a hypothesis based upon what they think is true. For example, Ms. Pérez may write a hypothesis such as the following: “District-wide fifth-grade students who struggle academically and receive direct instruction perform better on school achievement and on standardized tests than those who receive constructivist instruction.” After making this hypothesis, she would then conduct a study to determine if her hypothesis is correct or not.

One common strategy is to write a hypothesis as an “if . . . then . . .” statement. This guideline can be a helpful strategy because it requires the researcher to specify exactly what it is they are interested in studying. Mrs. Pérez may write her hypotheses as follows: (1) If district-wide fifth-grade students who struggle academically receive direct instruction, then their achievement in school and their scores on standardized tests will improve. (2) If district-wide fifth-grade students who struggle academically receive constructivist instruction, then their achievement in school and their scores on standardized tests will improve. Hypotheses derive from the statement of the problem and provide information on what researchers are investigating when they conduct their studies. They are typically the result from fine-tuned research questions that differ from questions posed in the first step of the scientific method because now they will likely be more specific and incorporate variables and relationships uncovered in the literature review that remain unanswered.

Collecting Data

The next step in the scientific method is to collect data. Data collection methods and the type of data collected depend on the type of research being conducted. For example, data may be generated from data collection instruments or tools that may include artifacts, observations, test scores, self-report scales, interviews, surveys, or a combination of different assessment instruments. Regardless of the type of research study one is conducting, it is necessary that data are collected objectively without any preconceived ideas or biases. The data must also be collected in a systematic way such that if another researcher wanted to replicate the research study, they would be able to follow the same procedures using the same instruments.

Analyzing and Interpreting Data

Data analysis is an essential aspect in all research designs. Statistical techniques are often used to analyze data that are numerical or easily quantifiable, such as if Ms. Pérez were to analyze teachers’ responses on surveys to predict end-of-the-year student performance. The choice

of data analysis should be directly tied to the research hypothesis and/or answer the research questions.

In some research designs, data analysis involves using language-based or non-numeric data to uncover themes and trends to understand or explain a phenomenon. If Ms. Pérez conducted interviews of the teachers in her school district, she might look for themes or patterns in their responses that provide insight into her research questions about which instructional approach seems most effective. Analyzing data usually involves the use of one or more techniques, depending on the type of design implemented and the types of data collected.

Interpreting the results from data analysis is the second part of this step in the scientific method. Here researchers will study the analyzed data or trends to understand its meaning. When examining the results from the data analysis, researchers will interpret the data in the context of the hypotheses and/or research questions or in terms of patterns or new insights. Regardless of the research design, the interpretation must also be honest and free from bias. Data alone are meaningless. It is how one interprets and presents the data that brings the data to life, and these interpretations provide the foundation for drawing conclusions and communicating about the research.

STOP AND THINK 1.2

As educators, what are some of the ways in which you would encounter data outside of the research context? What information might you observe from the data?

Drawing Conclusions and Communicating the Research

The final step in the scientific method is to draw conclusions from the findings and to communicate the research to others. After analyzing and interpreting the data, the researcher will reflect on the findings and draw conclusions that must be supported by the evidence (the data), and these conclusions may or may not support the researcher's hypotheses, answer the research questions, or explain a phenomenon. Conclusions from research should contribute to our knowledge and understanding about a problem or critical issue and can help educators find solutions to localized problems in their classrooms, school, or community, or more broadly—such as finding solutions to statewide or national problems. If Ms. Pérez found at the end of her study that there was no evidence that one instructional approach was more effective than the other, she may conclude that the type of instruction she uses will have less effect on student achievement than other variables. An example of how research can have an impact beyond a classroom or school would be if a group of educators and policymakers conducted a research study that involved second language vocabulary instruction in high schools across the United States and found one instructional method helped students more easily learn and remember new language vocabulary than all other methods. This finding could ultimately influence the recommended approaches for teaching a foreign language across the country.

Communication of the research study is an important part of this last step. Research may be communicated through presentations at conferences or professional workshops, in scientific journals, journals of practice, in blogs, and on websites related to the topic. There are several benefits related to communicating about your research. One in particular is the possibility

of influencing your work as well as the work of others. Research findings often are used to help educators make informed decisions along with suggesting problem-solving strategies that may help issues of practice. An additional benefit is that when research is communicated to others, the authors typically conclude with recommendations for further research. These recommendations can provide others interested in conducting research with some topics for future studies.

THE TAKEAWAY

Using the scientific method provide the necessary structure for objectively and rigorously conducting research!

BASIC RESEARCH VERSUS APPLIED RESEARCH

LEARNING OBJECTIVE

1.3 Differentiate between basic and applied approaches to conducting research.

There are many different types of research methods that educators can use to find solutions to their work-related problems or educational topics of concern; however, research methods tend to be categorized as either basic research or applied research. These two categories can be differentiated based on the purpose of a given study and its applicability to one's professional work or practice. Understanding the differences between basic research and applied research can help educators make decisions about which research methods to use before embarking on a research investigation.

Basic research is a type of research that is focused on the understanding of observable events or developing or expanding a theory. In trying to understand the causes of an observable event, basic research is focused on conceptual ideas and processes and will attempt to explain how or why things happen. Broadly speaking, basic research can also be very useful in theory development. Theories, which involve a set of integrated ideas to explain something, often take years to form. Conducting basic research can help develop and demonstrate key components of the theory. Another important aspect of basic research is that it is frequently employed in laboratories or artificial settings. For example, the psychologist B. F. Skinner developed his theory of operant conditioning using animals he placed in his "Skinner Box." By providing animals with positive reinforcements (food) in the Skinner Box, he was able to shape, control, predict, and record the animals' behaviors.

Applied research focuses on solving a specific problem or testing a theory to determine its usefulness to problems of practice. Unlike basic research, applied research studies typically do not typically contribute to a knowledge base about a phenomenon or theory; rather they contribute to a knowledge base regarding solutions to a particular problem. In other words, applied research is usually not generalizable or universally applicable because it is focused on addressing critical issues that educators grapple with in their schools. For instance, if teachers in a middle school decide to conduct an experiment using a new intervention program to help promote resilience among students who have lost family members, they would be conducting applied research.



Skinner trained animals using his skinner box and operant conditioning.

Walter Dawn / Science Source

Basic research and applied research are conducted with different purposes in mind. As indicated, the purpose of basic research is for the advancement or contribution of knowledge. This differs from applied research where the nature of the investigation is a problem or solution focused with participants, instruments, and data collected. In basic research, studies are often aimed at providing information that is generalizable and universally applicable. Thus, basic research studies can often lay the foundation for applied research. Due to the purpose of contributing knowledge, basic research studies tend to be exploratory, descriptive, or explanatory in nature. Table 1.1 presents some of the main differences between basic research and applied research.

In sum, the differences between basic research and applied research involve the purpose and practical focus of a given study. Perhaps an easy way to understand the difference is to think of basic research as research designed to help clarify concepts, make predictions, expand theories, or supply general information needed to solve problems, whereas applied research provides data that can help solve specific problems. While these two approaches seem very different from one another, they are not mutually exclusive, and some studies integrate both purposes.

In the *Let's See It!* we provide some examples of basic research and applied research questions, followed by an opportunity for you to practice in the *Let's Do It!* activity. At the end of the chapter, readers are provided with a self-directed exercise in the *You Do It!* activity.

TABLE 1.1 ■ Differences Between Basic Research and Applied Research

Basic Research	Applied Research
Purpose is to acquire new knowledge or expand on existing knowledge	Purpose is to find solutions to practical or specific work-related problems
Motivated by interest to better understand a phenomenon or advance theory development, thus the research tends to be more conceptual	Motivated by educators' concerns about issues of practice, thus the research tends to involve students, parents, colleagues, and confidential information
Pertains to expanding the understanding of concepts or events to explain a phenomenon or advance theory development	Pertains to examining the relationships among variables and generating data for the purpose of problem solving
Usually occurs in an artificial setting such as a laboratory that is highly controlled	Usually occurs within an authentic setting, such as a classroom or school
Findings or research outcomes are more generalizable and universal	Findings or research outcomes are most relevant to the sample studied
Often exploratory, descriptive, or explanatory—primary goal is to understand or explain things	Often includes action research, research and development, and program evaluation studies—primary goal is to generate data to solve problems

Let's See It! 1.2**Goal: Understand the Differences Between Basic Research and Applied Research Studies**

Directions: Read the following different types of research questions to gain an understanding of the different purposes of the studies.

Examples of Basic Research Questions

1. How does alcohol consumption affect the adolescent brain?
2. What are the causes of forgetting for children?
3. Are there cultural differences in participation in after-school extracurricular activities?
4. Do pop quizzes increase the time spent studying after school?

Examples of Applied Research Questions

1. Will eliminating homework increase participation in extracurricular activities for high school freshmen across the school district?
2. What are the ways that school administrators can help improve student attrition for students in marginalized communities?
3. Will offering students laptops improve science retention for African American girls in our state?
4. What is the impact of a meditation intervention program on student achievement scores for middle school students in California?

Let's Do It! 1.2**Guided Practice: To Gain Better Insight Into the Differences Between Basic Research and Applied Research by Practicing Writing Questions Related to Each Approach.**

Directions: Using the examples in the *Let's See It!* as models, practice writing two basic research questions and two applied research study questions.

Examples of Basic Research Questions

1. _____
2. _____

Examples of Applied Research Questions

1. _____
2. _____

Hopefully, these examples and practice opportunities have helped you understand the differences between basic research and applied research. Because applied research tends to be focused on specific practical problems, it includes action research, research and development, and program evaluation research studies. It is important to note that applied research can be beneficial because it provides educators with opportunities to conduct research and make a positive difference on students and school communities.

THE TAKEAWAY

Research methods tend to be categorized as either basic research or applied research, depending on the goals and objectives of the research.

WAYS IN WHICH EDUCATORS CAN BECOME REFLECTIVE EDUCATOR-RESEARCHERS**LEARNING OBJECTIVE**

- 1.4 Elaborate on how self-regulated learning can help educators become educator-researchers.

Self-regulated learning, which refers to setting personal goals and utilizing one's motivational and strategic skills for reaching these goals, is a useful framework for educators to envision themselves as educator-researchers. In all chapters of this textbook, we use self-regulated learning principles as features, such as the *Let's See It!*, *Let's Do It!* and the *You Do It!* activities, to help you

learn about research methods. We believe that becoming more strategic, self-aware, and reflective as you learn from this textbook will help you to independently think about and conduct your own research study. We now provide a brief overview of what we mean by self-regulated learning and how it can be a tool for reading and learning about research methods and eventually, conducting your own research study.

Self-regulated learning consists of a cycle of three phases: planning, doing, and reflecting (see Figure 1.3; Zimmerman, 2002). **Planning (in self-regulated learning)** includes setting goals, deciding what strategies you need to implement to reach these goals, and how motivated you are to work on these plans and goals. **Doing** refers to actively implementing or acting on the plans you made and monitoring these actions, while **self-reflecting** refers to thinking about the outcomes and making judgments on what worked well and what needs improvement. The nature and quality of one's self-reflection impacts how one plans before a new attempt at learning. This cyclical model of self-regulated learning is not only embedded in several key features used throughout this book, it can also serve as a "thinking guide" for educators when conducting research or as part of their professional activities.

FIGURE 1.3 ■ Self-Regulated Learning Cycle



Planning can help all of us be more effective in learning new things because it involves setting goals, developing strategies to reach our goals, and feeling a sense of **self-efficacy**—beliefs in our capability to reach our goals. Self-efficacy beliefs, which one can also think of as self-confidence, can help motivate us as we learn or engage in behaviors.

STOP AND THINK 1.3

Using the phase of planning, think about your goals and plans for how to read and learn the material presented in this book. Do you have a clear plan? How confident (self-efficacious) do you feel about being able to understand the content of this book's content now that you know it is presented in an easy-to-understand way?

Doing involves carrying out the plans that were made during the planning phase. During the doing phase of the cycle, we keep track of our progress and use metacognitive monitoring. Keeping track of our progress can be done in a number of ways such as using a checklist or daily planner—it provides us with overt information about our progress. Metacognitive monitoring is more covert, by thinking about what is working well or not, it allows us to make on-the-spot adjustments to help us reach our goals. Metacognitive monitoring involves being aware of our

thoughts as we carry out our plans. These subprocesses can be used by educators to help them sustain their motivation to learn about research or to conduct research. As you begin to read this textbook, it is important to think about the different ways in which you can monitor or keep track of your understanding and progress. We developed several features in this book to help you do this very thing!

STOP AND THINK 1.4

Give some examples of how you monitored your progress on an important task? Did you find it a helpful strategy for reaching your goals?

Self-reflection is a process that most educators engage in on a regular basis that involves evaluating and reacting to outcomes. Self-reflecting is an important professional skill in that it can help educators identify strengths and weaknesses in their performance at work and in their research and can highlight new possibilities on how to improve. For example, if Ms. Pérez from our opening scenario uses direct instruction to carry out her lesson plan, she may observe that while teaching, many students appeared bored and disengaged. Using this self-monitored information, Ms. Pérez may decide to add some group activities to her new lesson plan. In this simple example, she began with a specific lesson plan (planning), followed by implementing a direct instructional approach. Based on the information she gathered about the effects of her teaching (doing), she reflected on whether her instructional approach needed to be modified (reflecting)—thus she incorporated all three phases of the cycle.

In reading the chapters in this textbook, you will find each chapter provides readers with many practice opportunities to self-regulate their learning. As you complete these activities, you will gain a sense of your own understanding. We encourage you to openly reflect on whether you need to go back to the text and review the material or whether you can move forward with the next section or chapter. In addition to using the three phases of self-regulated learning as you read this book, you can also consider using them in each of the steps of the scientific method as one embarks on conducting research.

Now that we have discussed the three phases of self-regulated learning and how they can be tools to help you learn and conduct research, we would like educators to understand the ways in which they can become self-regulated or develop competency to learn research methods and successfully conduct research.

STOP AND THINK 1.5

Have you been in situations where you stopped to reflect on your behavior and the outcomes? Has that helped you perform better next time?

Developing self-regulated learning competency in conducting research is a gradual process that consists of four developmental levels (Schunk & Zimmerman, 1997; see Table 1.2). The first level is **observation level**: watching a model demonstrate an activity or reading or

seeing examples in written form. This is followed by the **emulation level**: practicing what was observed under the watchful eye of someone with more expertise who will scaffold as needed. Next is the **self-control level**: performing what was previously practiced but with greater autonomy and minimal supervision or help. Lastly is the self-regulation level: independently engaging in the original activity or a similar activity to what was observed and making adaptations as needed.

It is important for readers to understand that becoming a competent researcher is more of a journey than sprint. You first need to see or hear what good research looks like (e.g., *Let's See It!*) and then get the necessary practice and feedback (e.g., *Let's Do It!*) to apply what was learned. A primary goal of this textbook is to model key research concepts, provide guided practice opportunities for readers, and then offer more independent practice activities. In Table 1.2, we provide a scenario demonstrating the development of self-regulatory competency in conducting research where Dr. Rebecca Schwartz, a faculty member, is mentoring Bradly, a master's student in the higher education leadership program at her college. Bradly expressed an interest in assisting Dr. Schwartz in her research study that involved conducting focus groups on principals' thoughts about standardized curriculums. While the study protocol requires asking the focus group participants specific questions, the follow-up questions are made "on-the-spot" because they are based on the participants' responses to the standardized questions. It is these on-the-spot questions that seem to generate interesting information for Dr. Schwartz's study. Dr. Schwartz assists Bradly in becoming self-regulated enough to run his own focus group for her research study. Each level is presented in the left column, followed by a brief description of the level in the middle column, and an example in the third column.

Level	Explanation of the Level	Example of the Level
Observation	Learn by watching a model demonstrate an activity or learn by reading or seeing examples in written form	Bradly sits quietly during a focus group meeting and observes how Dr. Schwartz asks questions and encourages discussion among the participants with follow-up questions.
Emulation	Emulate what demonstrated under the close supervision of someone more experienced who may scaffold as needed	Dr. Schwartz gives Bradly the list of questions she created and encourages him to ask the questions as she did with the other participants. Bradly models asking the questions in the same way that Dr. Schwartz asked them. Dr. Schwartz jumps in with follow-up questions at times to get the participants to further elaborate or expand on the discussion.
Self-Control	Engage in tasks with limited direct supervision of the model or someone more experienced	Dr. Schwartz asks Bradly to create his own follow-up questions after the initial questions are asked. Dr. Schwartz remains available but is not part of the focus group.
Self-regulation	Engage in tasks independent of others	Bradley is able to now run an entire focus group meeting independently. He begins using the standardized questions and is comfortable asking his own follow-up questions to increase discussion on the topic.

We have highlighted these levels and their importance because this model is foundational for educators developing into researchers. In the next section, we discuss several logistical issues relevant to education-researchers and the importance of diversity, equity, and inclusion in conducting research.

THE TAKEAWAY

Self-regulated learning can help educators develop into educator-researchers.

KEY LOGISTICAL FACTORS AND DIVERSITY, EQUITY, AND INCLUSION CONSIDERATIONS IN CONDUCTING RESEARCH

LEARNING OBJECTIVE

- 1.5** Consider key logistical constraints and diversity, equity, and inclusion considerations in conducting research.

As you read the chapters in this book and the many examples and scenarios that we provide, you will hopefully see that conducting research can be exciting, enjoyable, rewarding, although somewhat challenging at times. In this section, we describe some of those challenges to help educators anticipate obstacles that may arise so that they are better equipped to deal with them. The three challenges we believe are most common that must be confronted before conducting a research study are knowledge or expertise in research design and methodology (which you will learn from this textbook), the time and resource demands to conduct school-based research, and the constraints that naturally exist within and across many schools. Finally, diversity, equity, and inclusion considerations are discussed as they relate to research in educational contexts.

Expertise in Research Design

Many educators or other school personnel either do not feel self-efficacious about their capability to conduct research or do not believe they have sufficient expertise in research design and methodology without coursework or training. We believe, however, that educators who carefully read and study this textbook will become more knowledgeable and competent in conducting research or will develop the background knowledge needed to seek additional resources to help them in conducting their own research study. By studying and practicing the many activities within the chapters, in particular the *Let's See It!*, *Let's Do It!*, and *You Do It!* sequence of exercises, you will enhance your knowledge, skills, and confidence in conducting research.

Managing Time Limitations

Educators are often inundated with teaching and other professional responsibilities and may feel as if they have little to no time for new activities, let alone the time to conduct a research study! However, what may seem like additional work may actually save time for educators, improve the quality of their work, and perhaps most importantly, enhance the quality of education for students. While conducting research *is* time-consuming, it provides educators with the opportunity

to solve a problem related directly to student learning or one that may already be taking time away from other academic-related activities.

Consider a district with historically low school attendance rates. As a result of low attendance, teachers and administrators rotate daily to call students and their families to check on why they are absent. In addition, teachers need to continually set aside time for students to make up missing coursework. The attendance office staff must also devote substantial time to monitoring student attendance and sending emails and written notices to the homes of students who are absent. The various deans or administrators are required to spend time reviewing students' records to determine whether they have been absent too many class days to be promoted to the subsequent grades. These activities reflect hours of time not dedicated to other important education-related activities. While conducting a research study may take time to develop, implement, and analyze, the results from a study may lead to preventative remedies to help these schools and benefit all the educators and students who are missing out on learning. Conducting a research study can also reflect a proactive approach to making innovative improvements or substantial changes. Either way, the time spent conducting research can be offset by the benefits from the findings.

STOP AND THINK 1.6

Are there other constraints that might make conducting research difficult in your school?

School Characteristics as Constraints

Schools vary in terms of financial stability and availability of educational resources. In urban contexts or marginalized communities, schools may lack adequate funds for purchasing books, enrichment programs, computers, and other academic support programs. To further complicate matters, these types of schools and communities may, at times, need to reallocate and use funds earmarked for educational initiatives to address more emergent concerns, such as school safety and school building repairs and updates. Collectively, these issues underscore the need for researchers and educators to collaborate and pool resources for developing a stronger research infrastructure. Educators who are interested in conducting research may seek to collaborate with faculty members from universities who may have access to funding. Many university faculty would welcome the opportunity to collaborate with educators and gain access to schools and students. In addition, there is always the possibility of applying for financial support through grants. Grant money can be used for a variety of research-related activities, such as professional development workshops, classroom supplies, school equipment, and instructional intervention programs for students.

Diversity, Equity, and Inclusion in Conducting Research

Diversity, equity, and inclusion (DEI) considerations in conducting research should be in the forefront and addressed in each aspect of the research process beginning with the research topic. Research topics, for example, could include racial inequalities in grading, the tendency to over-diagnose boys and children of color with attention deficit hyperactivity disorder, the over-disciplining of children of color, the digital divide—a phrase used to describe the critical issue of



Conducting research can ultimately save educators time and improve student learning.

©iStockphoto.com/gradyreese

not all students having equal access to technology—and the achievement gap between groups of students based on race and ethnicity.

Educators should critically examine their theoretical framework, hypotheses, and/or research questions to ensure they are relevant to the populations they are targeting. It is also important for educators to make decisions about their sample selection to ensure the participants reflect the school, community, and nation, depending on the intent to use the findings. Samples should be selected based on the research design and researchers ought to include a diverse sample based on race, sexual orientation, gender identification, ethnicity, socioeconomic status, giftedness, disabilities, and underrepresented and marginalized groups when appropriate. Researchers have a responsibility to use measurement instruments that are gender neutral, free from bias, and designed to be culturally appropriate for diverse populations.

The protocol for conducting research studies must also be sensitive to DEI and be administered by researchers who are objective and free from bias. Analyzing findings, drawing conclusions, and communicating results should take diversity, equity, and inclusion into account and again be gender neutral and free from racism and bias.

As you can see, there are many logistical challenges to consider when deciding to conduct research in schools, and the importance of DEI should be considered in all aspects of conducting research.

THE TAKEAWAY

Expertise in research; time and logistical issues; school characteristics; and diversity, equity, and inclusion are important considerations when embarking on a research study.

ETHICAL CONSIDERATIONS

LEARNING OBJECTIVE

- 1.6** Demonstrate knowledge of ethical issues when conducting research involving human subjects.

Ethical considerations are critical when conducting research and emphasized throughout this book. We begin by introducing this topic with a focus on the importance of using ethics in working with human subjects. Research studies that involve humans must be submitted to the institutional review board (IRB) for review and approval and must meet a number of standards for research in public school systems and universities. While in Chapter 3 we discuss the IRB and the need to obtain permission from students and parents to conduct research in greater detail, we want to emphasize the importance of ensuring that all research presents no risks of harm to human subjects.

Several decades ago, there was little-to-no regulatory oversight on what researchers could do with participants. Institutional review boards, which are designed to protect human subjects from harm, were nonexistent. For example, the infamous study by Milgram (1963) on obedience to authority violated many codes of ethics, particularly deception. In this research (see Milgram, 1963), Milgram obtained participants from newspaper ads advertising for males to participate in a study on learning at Yale University. The procedure involved pairing the participant with another person. Milgram had the two people draw lots to find out who would be the “teacher” and who would be the “learner.” The drawing was fixed so that the participant was always the *teacher* and the *learner* was always someone who was pretending to be a participant but was actually working with Milgram on the study. The learner was taken to a room where electrodes were attached to his arms, and the teacher and researcher went into another room that had a fake electric shock generator and a row of switches with voltages ranging from 15 volts (Slight Shock) to 450 volts (Danger: Severe Shock).

Milgram was interested in seeing how far someone (the teacher) would go in administering the shocks to the learner when told to do so by the researcher who represented an authoritative figure. The learner was given a list of words to recall, and he intentionally made mistakes when the teacher tested him, thus prompting the researcher to tell the teacher to punish the learner by shocking him. Every time a (fake) shock was administered, the learner screamed out in pain (although he was not really in pain), and the screams intensified as the voltages increased. Even with the screams, 26 of the 40 participants administered the highest voltage shock on the generator. According to Milgram, “The procedure created extreme levels of nervous tension in some Ss (participants). Profuse sweating, trembling, and stuttering were typical expressions of this emotional disturbance. One unexpected sign of tension—yet to be explained—was the regular occurrence of nervous laughter, which in some Ss (participants) developed into uncontrollable seizures” (p.1, 1961). Milgram’s study showed that people will obey an authority figure, even if it involved inflicting pain on others. Clearly, there are several breaches of ethics in this study—such as deception, failure to protect participants, and the right to withdraw at any time during the experiment. Many of the participants suffered long-term emotional and psychological disturbances from participating.

A second research study that breached ethical issues was conducted in the medical field. In 1932, the United States Public Health Service conducted research with the Tuskegee Institute

in Alabama to study the course of syphilis in men. Six-hundred African American males, 399 of whom had syphilis and 201 of whom did not have the disease, participated in the study. Syphilis is a sexually transmitted disease that can cause serious health problems if left untreated—such as nerve and brain damage, paralysis, tumors, blindness, and death. Researchers targeted mainly poor rural men who had never been treated by a doctor, and when visiting them, told the men they were being studied for “bad blood”—a local term used to describe several conditions, such as fatigue, anemia, rashes, and flu-like symptoms, among others. The men who agreed to participate in the study received free medical exams, free meals, and free burials. Without knowing they had a contagious disease, many of the men passed the disease on to their partners. Pregnant women who had syphilis passed the disease to their children. In the mid-1940s, penicillin became the nationwide treatment for people who have syphilis, but this was not made available to the men in this study who were viewed as participants in this research and not considered patients. Forty years later, in 1972, an investigation took place. The investigation was prompted when the information about the study was leaked to the media: newspapers, television, and radio. Many of the participants had died of syphilis or related symptoms, infected their wives, and had children born with congenital syphilis. This study remains one of the most unethical research studies conducted on human subjects and the impetus for the *Belmont Report*.

The *Belmont Report* created from the National Research Act of 1974 developed guidelines for conducting ethical research due to a series of harmful and unethical studies, such as the Tuskegee Syphilis Study and Stanley Milgram’s Obedience to Authority Study. The *Belmont Report* outlines three areas of focus in protecting participants: respect for persons, beneficence, and justice (U.S. Department of Health and Human Services, 2022).

When conducting research, **respect for persons** entails that participants in the study must be treated as autonomous human beings. Lack of respect is shown when a researcher rejects a participant’s ability to act on their judgment or information. However, not all participants are capable of acting autonomously. For example, children need guidance developing autonomy, individuals who struggle with mental illness, and those who are imprisoned may lose the capacity to act autonomously. Respect for these vulnerable individuals requires that protections are offered because they cannot act autonomously.

Beneficence centers on maintaining the well-being of all participants by conducting research that does not cause harm and that maximizes the possible benefits for the participants. For example, deceiving a participant about the purpose of a study could potentially cause harm if what the participants are engaging in goes against their own beliefs and restrictions (e.g., providing sensitive information that could be used in a manner that is not clearly stated to the participant can result in discrimination and harassment). A critical issue related to beneficence is that participants cannot be coerced to participate. All participants need to be informed that they can withdraw from the study at any time without penalty. If a teacher asked a trained colleague to interview eighth-grade students about anti-bullying campaigns in the school, they would need to obtain informed parental consent forms and minor assent forms from the students. If a participant who was in the middle of an interview wanted to stop, the interviewer would have to honor the request without coercion. This would ensure that the well-being of the student is taken into account and that they are not put in jeopardy for the sake of the study.

The third section of the *Belmont Report* is known as **justice**. To have a framework of justice within a research study, the educator/researcher should ensure that all potential participants have an equal opportunity to be selected to participate in a study. Thus, the principle of justice requires vulnerable individuals to receive special protections regarding the benefits of the study. The vulnerable should be assured of receiving their fair share of the benefits and also be

protected from having more than their fair share of the burdens of research imposed on them. If a researcher chooses to study an after-school STEM program, all eligible students in the school need to have an equal chance of being selected for the research study, according to justice. This action ensures that no one is denied access to a beneficial program without a fair system of selection in place. If the researcher wants to select one of six fourth-grade classrooms to participate in a research study on STEM education during the school day, the classroom could be randomly selected, and then students in the selected classroom could be invited to participate in the study.

As you can see from the two studies described previously, it is critical that researchers read and adhere to the guidelines provided in the *Belmont Report*.

THE TAKEAWAY

Research that involves human subjects must maintain ethical standards, and researchers should review the Belmont Report to understand the ethical principles prior to beginning a study.

A LOOK AHEAD: ORGANIZATION OF THIS BOOK

LEARNING OBJECTIVE

1.7 Identify the various content features in the individual chapters of this book.

In this section, we describe the organization and overall content of the book. Across the various chapters of this book, we describe multiple effective approaches for conducting research. Each chapter begins with learning objectives that correspond to the various sections of the chapter and then discusses ethical considerations in conducting research. Beginning with Chapter 2, the last learning objective in each chapter discusses guidelines from the latest edition of the *Publication Manual of the American Psychological Association*.

We have organized and sequenced the chapters into what we believe is a natural flow to learning about research methods. Beginning with Chapter 2, “Reviewing the Literature,” we provide readers with information about how to explore, review, and analyze challenges in the workplace to identify critical issues in education. Most importantly, this chapter provides an overview of the purposes and steps to conducting, reviewing, and synthesizing a literature review and how to articulate a research problem or question using the planning, doing, and self-reflecting phases of self-regulated learning. In our opening scenario, given that Ms. Pérez had already identified a critical issue (i.e., direct versus constructivist instruction) of interest to her, she is ready to complete Step 2 of the scientific method, conducting the literature review. Her plan is to conduct a literature review on different instructional approaches and their effectiveness before developing her research questions and hypotheses.

Chapter 3, “Research Design: The What, When, and How of Research,” helps readers understand the broad distinctions between research methodology and designs. This chapter provides information on the differences and similarities between qualitative and quantitative methodologies as well as some of the key designs subsumed within each methodology. This chapter introduces readers to various research designs and provides decision-making guidelines to help

readers determine the most effective designs for addressing a particular research question. Given her interests, Ms. Pérez may ultimately decide to survey teachers in her district (quantitative methodology) or conduct personal interviews of teachers in her district (qualitative methodology), or she may choose to do a combination of both (mixed methods). This chapter presents foundational concepts and principles linked to subsequent design chapters.

In Chapter 4, “Non-experimental Research Designs,” we discuss the key features of non-experimental designs and provide insight into the types of research questions that can be best addressed with such designs. Specifically, we compare and contrast descriptive, correlational, and comparative non-experimental designs in terms of the nature of relevant research questions, measurement-related issues, and sample-related issues. In our opening scenario, Ms. Pérez was concerned about which teaching approach is most effective for students who struggle academically. She decided to develop and administer a survey to teachers in her school district to uncover non-teaching variables that could contribute to students’ academic success. The survey targeted multiple variables, such as years of teaching experience, instructional approaches, attitudes toward marginalized populations, beliefs about student motivation, and teacher self-efficacy. This chapter could be useful to Ms. Pérez and others who are interested in using research to describe the nature or relationships among different variables.

In Chapter 5, “Experimental Research Designs,” we begin with a discussion of the common threats to internal validity and the link between experimental design features and internal validity. This is followed by descriptions of true experimental, quasi-experimental, and single-participant experimental designs. In addition to administering her survey, Ms. Pérez also collected end-of-year student grades and found that instructional approaches were, in fact, highly correlated with students’ end-of-year grades. While this information was useful, Ms. Pérez wanted to examine the effects of different instructional approaches on student learning. Given that she recognized the limitations of correlational studies for drawing conclusions about cause and effect, she decides to conduct an experiment to determine if the two instructional approaches differentially impact end-of-year grades. Chapter 5 is the go-to chapter for educators who want to examine issues pertaining to the causal effects of intervention or instructional activities within the classroom.

Chapter 6, “Qualitative Research Designs,” is dedicated to helping educators understand the characteristics of qualitative research. Qualitative research is dynamic and adaptable by nature, and this chapter identifies the types, purposes, and process of conducting qualitative research as well as the breadth of designs (i.e., case studies, phenomenology, grounded theory). If Ms. Pérez decided she wanted to gain insights about the perspective, attitudes, or lived experiences of teachers and administrators when working with students who struggle academically, she could read Chapter 6 for guidance about the characteristics of conducting a good qualitative research design as well as the roles of the researcher when using such designs.

Chapter 7, “Mixed Methods Research Designs,” describes the nature of a mixed methods research design and when it is most appropriate to use. We identify the types of commonly used mixed methods research designs and the steps involved in planning, conducting, analyzing, and interpreting the findings from mixed methods research. If Ms. Pérez decides to conduct a mixed methods research design, she will combine information from surveys, focus groups, and individual interviews with teachers. She believes this approach will provide her with a more comprehensive picture of what teachers’ beliefs and experiences are before moving forward with an experimental design. This chapter would help guide her in using this methodology.

In Chapter 8, “Action Research for Educators,” we define action research and its origin, distinguish it from other research designs, and underscore the benefits of conducting action

research within school contexts. In addition, we provide an overview of the differences between practical and participatory action research and describe how the cycle of self-regulated learning overlaps with the action research cycle. Ms. Pérez read about action research in her research methods class and has decided that rather than conduct a larger study involving other teachers, administrators, and students, she will conduct an action research study in her classroom. For the first half of the school year, she will use direct instruction, and for the second half of the school year, she will use a constructivist approach to determine which approach results in higher grades. Action research can help educators conduct research within their own classrooms or school settings and create transformative changes in themselves and others.

In Chapter 9, “Program Evaluation,” we describe the characteristics of program evaluation. We identify the purposes, types, characteristics, and typical logic model of program evaluation initiatives. In addition, we identify how to create, conduct, analyze and report findings of a program evaluation. At Ms. Pérez’s school, the principal wants to assess the benefits of developing professional development workshops on constructivist practices. This chapter can help Ms. Pérez’s principal make decisions on the evaluation of using a constructivist approach before requiring it in her school.

In Chapter 10, “Sampling and Measurement Learning Objectives,” we present information about how to select a sample for a research study. In addition to discussing sampling-related terminology, probability and non-probability sampling techniques, and sampling error, we compare sampling across quantitative, qualitative, mixed methods, and action research designs. We clarify the differences between measurement and measurement error, differentiate levels of measurement, and discuss the different types of validity and reliability in measurement. If the superintendent in Ms. Pérez’s school district decided to conduct a statewide research study on instructional strategies, they would gain some insights into the best approaches to use in obtaining a sample of participants rather than attempting to use participants from all schools within the state.

In Chapter 11, “Data Collection,” we discuss tools and methods for gathering and organizing data within educational settings and the advantages and disadvantages of quantitative and qualitative data. Central to this chapter is the critical role of data collection instruments (e.g., surveys, interviews, observations) in the research process and how data collection sets the stage for data analysis. Before Ms. Pérez conducts a study on instructional approaches, she needs to make decisions about the specific data collection instruments or approaches to use in her study. Chapter 11 can help provide guidelines that can assist her in making these decisions.

Chapter 12, “Descriptive Statistics,” focuses primarily on descriptive statistics, an aspect of statistics that focuses on numerically and visually summarizing the data included in a dataset. In addition to presenting an overview of the key characteristics of datasets and the purpose of descriptive statistics, we describe the most effective ways of visually depicting a distribution of scores, discuss measures of central tendency, and identify and explain different metrics of variability of scores in a distribution. We also discuss procedures for determining where an individual’s scores rank in relation to others and highlight the use of correlational analysis as a descriptive statistic. When Ms. Pérez was in her teacher education program, she read through several articles that presented different types of data, including measures of central tendency and variability. By reading this chapter, she will understand what these concepts mean in the context of research and how this information is essential when analyzing and interpreting results from her research study.

In Chapter 13, “Inferential Statistics,” we define and describe inferential statistics and provide information on probability and what it means to indicate research results are statistically significant. We also provide information on conducting hypothesis testing, interpreting

statistical significance, and comparing and contrasting commonly used inferential tests, including the distinction between parametric and nonparametric statistics. Ms. Pérez knows it is not realistic to conduct her study on every teacher in her school district. Thus, she selects a sample to collect data from and then hopes to determine whether the results with the sample is what one would expect to see in the broader population. This chapter will help her understand when to make inferences about whether the research results represent real and meaningful effects.

In Chapter 14, “Qualitative Analysis,” we discuss foundational principles of qualitative analysis and detail coding techniques. We provide readers with methods for analyzing qualitative data across different qualitative designs and various ways to organize and present data. If Ms. Pérez used teacher focus groups and interviews as her primary data collection instruments, she will need to use an analysis approach for identifying codes and themes or broad ideas in the qualitative data. For example, she may notice that several teachers express lacking self-efficacy and feelings of frustration in obtaining adequate funding to help their students. This chapter will help Ms. Pérez understand the various ways to create meaning about the lived experiences and perspectives of the sample.

Chapter 15, “Communicating Research,” shifts the focus from conducting to communicating research. We identify best practice approaches to written and oral communication, discuss key considerations when communicating research, and underscore how self-regulated learning principles apply equally well to helping educators not only become successful researchers but also effective communicators. Ms. Pérez plans to publish her research in an academic journal upon completion. This chapter will help Ms. Pérez understand the components of a journal article and how to engage in self-regulated learning to accomplish her goal.

Chapter 16, “Using Research to Guide Practice,” describes the ways in which research can be directly linked with practice. We provide insights into how to evaluate the quality of research and discuss the specific ways in which research can be used to support practice for teachers, administrators, and the community. We describe the impact of research on higher education programs and professional and personal growth and discuss the use of self-regulated learning to implement research-based change. Ms. Pérez was initially motivated to conduct research on teaching strategies because she was concerned about ensuring her students were provided with the best instructional approach. However, after speaking with professors from her teacher education program, she realized that student achievement was an issue with which many schools were struggling. Ms. Pérez is hoping that with her research, she will learn ways to improve student learning and importantly, have an impact on the current literature on teaching students who struggle academically.

CHAPTER SUMMARY

This chapter provides an overview of the benefits and characteristics of educational research and describes research methods in the context of educational settings. The chapter presents six steps of the scientific method for conducting educational research and differentiates between basic and applied approaches to conducting research. This chapter also describes how educators can become better learners and users of research methods and prepare themselves for conducting research using self-regulated learning followed by a discussion of logistical issues to consider and the importance of taking into account diversity, equity, and inclusion when conducting research in schools. The chapter closes with a discussion of the ethical considerations in conducting research on human subjects and a brief summary of the subsequent chapters.

EXTENSION ACTIVITIES

You Do It! 1.1**Self-Directed Practice: Writing the Statement of the Problem and Research Questions on a Critical Issue in Education**

Directions: Describe a critical issue in education, then write a statement of the problem and potential research questions you would seek to have answered.

Description of the Critical Issue

Statement of the Problem

Research Questions

You Do It! 1.2**Self-Directed Practice: Practice Distinguishing Basic From Applied Research**

Directions: Using Table 1.1, list four differences between the basic research and applied research from the abstracts that follow

Basic Research Example

Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology, 60*, 1–10. <https://doi.org/10.1016/j.cedpsych.2019.101832>

This article discusses motivation from the perspective of Bandura's social cognitive theory. Motivation refers to processes that instigate and sustain goal-directed activities. Motivational processes are personal/internal influences that lead to outcomes—such as choice, effort, persistence, achievement, and environmental regulation. Motivation has been a prominent feature of social cognitive theory from the early modeling research to the current conception involving agency. The conceptual framework of reciprocal interactions is discussed, after which research is summarized on behavioral, environmental, and personal influences on motivation. Key internal motivational processes are goals and self-evaluations of progress, self-efficacy, social comparisons, values, outcome expectations, attributions, and self-regulated learning. Critical issues confronting the theory include diversity and culture, methodology, and long-term effects of interventions. The article concludes with additional recommendations for future research on contexts, conceptual clarity, and technology.

Applied Research Example

Pickering, J. D., Bickerdike, S. R. (2017). Medical student use of Facebook to support preparation for anatomy assessments. *Anatomical Science Education*, 10(3), 205–214. <https://doi.org/10.1002/ase.1663>.

The use of Facebook to support students is an emerging area of educational research. This study explored how a Facebook page could support Year 2 medical (MBChB) students in preparation for summative anatomy assessments and alleviate test anxiety. Overall, Facebook analytics revealed that in total, 49 (19.8% of entire cohort) students posted a comment in preparation for either the first (33 students) or second (34) summative anatomy assessments. Eighteen students commented in preparation for both. In total, 155 comments were posted, with 83 for the first and 72 for the second. Of the 83 comments, 45 related to checking anatomical information, 30 were requiring assessment information, and 8 wanted general course information. For the second assessment, this was 52, 14, and 6, respectively. Student perceptions on usage and impact on learning and assessment preparation were obtained via a 5-point Likert-style questionnaire, with 119 students confirming they accessed the page. Generally, students believed the page was an effective way to support their learning and provided information that supported their preparation with increases in perceived confidence and reductions in anxiety. There was no difference between gender, except for males who appeared to be significantly less likely to ask a question as they may be perceived to lack knowledge ($P < 0.05$). This study suggests that Facebook can play an important role in supporting students in preparation for anatomy assessments.

Basic Research	Applied Research

KEY TERMS

Applied research	Research questions
Basic research	Respect for persons
Beneficence	Scientific method
Doing	Self-control level
Educational research	Self-efficacy
Emulation level	Self-reflecting
Hypothesis	Self-regulated learning
Justice	Self-regulation level
Observation level	
Planning (in self-regulated learning)	
Research methods	

ANSWER KEY

Stop and Think Activities**STOP AND THINK 1.1**

Most students will have used Google to search for information. Unlike much of the information on Google, the literature review typically provides information that is credible and has been reviewed by peers in the field.

STOP AND THINK 1.2

Answers may vary, but for teachers, the data may include assignments and test grades, students' responses to questions, conversations with students, meeting with parents, and classroom observations. Administrators may look at admissions and enrollment data, attrition data, diversity data, cost of attendance data, graduation rates, percentages of students attending colleges, and students' performances in competitive athletic or cultural events, to name a few. All of these data provide educators with information that can be very useful in understanding their current situations, making decisions, and in developing problem-solving strategies.

STOP AND THINK 1.3

Answers will vary. Some plans may be the following: to skim the chapters before reading them, to take notes on the chapters, to complete all activities, to work with a study partner, and so forth. We are hoping that readers will indicate they feel self-efficacious about learning the material in this textbook.

STOP AND THINK 1.4

While answers will vary, there is considerable research to support that self-monitoring can help us keep track of progress to reach our goals.

STOP AND THINK 1.5

Responses will vary, but like Stop and Think 1.4 research supports the idea that self-reflection can help us perform better in subsequent tasks. When we self-reflect, we are able to review what we have done and think about whether we can make improvements in our behavior in the future to lead to more positive outcomes.

STOP AND THINK 1.6

Responses will vary depending on the school setting, but an example of a constraint not already discussed includes accessibility to students—some schools may not be receptive to having research conducted among their students, and parental consent may be difficult to obtain. Parents may not approve of their children participating in a research study.

Let's Do It! Activities**LET'S DO IT! 1.1****Guided Practice: To Practice Writing a Statement of the Problem and Research Questions**

Directions: Imagine you are a principal of a rural elementary school and have been asked by the superintendent to separate all boys from girls for instructional purposes because the superintendent believes students will be less distracted from one another, which will ultimately lead to greater student achievement. Imagine that you do not agree with this approach and believe it can be detrimental to students' achievement and socioemotional development to separate them

throughout the day. Write a statement of the problem as you see it, then describe a couple of research questions you might ask if you were going to conduct a study on this.

Statement of the problem: Segregating students based on birth gender can have detrimental effects on students' achievement and socioemotional development. Single sex education can promote harmful gender role stereotypes among students and faculty. In addition, it can promote discrimination among students who identify as the opposite sex or who are nonbinary.

Examples of Research Questions

1. Will there be a difference in student achievement among students who are separated by gender for instruction?
2. Will students who are separated by gender feel as if they are being discriminated against as they are forced to conform to gender-role stereotypes?

Let's Do It! 1.2

Guided Practice: To Gain Better Insight into the Differences Between Basic Research and Applied Research by Practicing Writing Questions Related to Each Approach

Directions: Using the examples in the *Let's See It!* as models, practice writing two basic and two applied research study questions.

Examples of Basic Research Questions

Examples can vary greatly, however here are two additional examples:

1. Do courses in teacher education programs that focus on cultural diversity impact curriculum choices in schools?
2. What are the ways that parental involvement in homework promotes accountability among students?

Examples of Applied Research Questions

Examples can vary greatly, however here are two additional examples:

1. What are the perceptions of teachers regarding a professional development program on mathematical instructional effectiveness across high schools in the district?
2. Do 12th-grade students feel more self-efficacious about learning science than ninth-grade students in our school?

Do not copy, post, or distribute