



EDUCATIONAL RESEARCH

Fundamental Principles
and Methods

EIGHTH EDITION



James H. McMillan

Educational Research

Fundamental Principles and Methods

EIGHTH EDITION

James H. McMillan

Virginia Commonwealth University



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About the Author



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Dr. James H. McMillan is Professor Emeritus in the School of Education at Virginia Commonwealth University (Department of Foundations of Education). He obtained his doctorate from Northwestern University and master's degree from Michigan State University. Dr. McMillan has also published *Research in Education: Evidence-Based Inquiry; Understanding and Evaluating Educational Research; the Sage Handbook of Research on Classroom Assessment; Assessment Essentials for Standards-Based Education; Classroom Assessment: Principles and Practice That Enhance Student Learning and Motivation;*

Classroom Assessment and Educational Measurement; and Better Being Wrong (Sometimes): Using Student Assessment Mistakes and Errors to Enhance Learning, in addition to more than 80 journal articles and book chapters. His current research interest is focused on student perceptions of classroom assessment and classroom assessment literacy.

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To the Instructor

Educational Research: Fundamental Principles and Methods is for both consumers of empirical investigations and beginning researchers. Consumers locate, read, understand, critique, and then use the results of research to become more effective professionally and to make sound educational decisions. Beginning researchers need to know the fundamental process of conducting good research, a foundation for learning how to conduct research and report results. The book is designed to enable students to become *intelligent* consumers and proficient investigators of educational research. It is intended for a one-semester or one-term course in educational research and is best suited for advanced undergraduate and beginning graduate students in all areas of education. The examples from studies bring sometimes obtuse and dull research principles to life by showing excerpts from published articles. Students will find them interesting and informative. There are over 160 excerpts from recently published studies from 70 different journals, representing various levels of rigor and myriad subject areas. Although the excerpts focus on the field of education and educational publications, this book is also appropriate for students in related social sciences who need to learn how to read and understand research and begin the process of becoming investigators.

The primary goal of this book is to educate students to be intelligent consumers and researchers. This is accomplished by promoting student understanding of a researcher's intent, the procedures, and the results. Students are then shown how to conduct, analyze, and evaluate research, judging the usefulness of the findings for educational practice, and provided guidance in writing research proposals and reports. More specifically, the book will help students develop the following skills:

- Apply the principles of disciplined inquiry to everyday problem solving and decision making.
- Develop a healthy skepticism about “studies” that purport to advance our knowledge.

Understand strengths and weaknesses of different methodologies used in research (quantitative, qualitative, mixed methods, and action research).

- Read, understand, critique, and use published reports of research.
- Understand the uncertain nature of knowledge about educational practice generated through research.
- Keep a balanced perspective about the relative contributions of research and professional judgment.
- Understand how to conduct research.
- Write research proposals and reports using appropriate academic/scholarly voice and style.

These goals are reached with a concise, engaging presentation of principles for conducting research and criteria for evaluating its overall credibility. The style of the book is informal, the language is nontechnical, and no prerequisite courses in measurement or statistics are needed. Numerous illustrations and excerpts from actual studies, as well as complete published articles, are used as examples to familiarize students with the style and format of published articles, to introduce students to the language of research, and to point out key features and parts of published studies.

The book covers fundamental principles in the sequence found in the research process, beginning with the identification of researchable problems and ending with conclusions. The emphasis is on teaching students that all aspects of conducting and reporting research are important in judging the overall credibility of the findings, and how different parts of the research process are interrelated and need to be clearly aligned. The format of research articles is included in the first chapter to help students read and comprehend published studies as early as possible in the course. My experience is that students need as much practice as possible reading and critiquing articles. The first chapter also introduces different research methodologies. I have found this introduction helpful in providing an initial understanding of different approaches, including quantitative, qualitative, and mixed methods designs that are covered in greater depth in later chapters. From the beginning, students are able to identify different types of studies.

The book is now divided into five parts. **Part 1** includes chapters that introduce students to the nature of research, ethical guidelines, research problems and questions, and literature reviews. The purpose of these

chapters is to provide students with sufficient knowledge and understanding to begin to design their own empirical investigation and to critically evaluate published articles. Chapter 1 introduces students to the concept of the signal and the noise, a metaphor that is used throughout the text, and provides an overview of the nature of disciplined inquiry and types of research. Chapter 2, on ethics, ethical principles, and ethical practices, is included early in the book to emphasize the importance of these principles in both the conduct and reporting of research, consistent with the new 2018 Common Rule revisions. The following chapter, which focuses on research problems and questions, shows students how to conceptualize and word research questions that align with methodology.

Because good consumers and investigators need to know how to find helpful research, the chapter on reviewing literature includes skills in locating primary and secondary sources, in evaluating a review of literature section of an article, and writing a review of literature. This edition has a much greater emphasis on reviewing literature than most introductory research books. There is extensive discussion on how to write the review, something many students need to accomplish relatively early in research courses if they need to prepare a proposal. The chapter provides hints, sites, and procedures that will make it easy for students to use ERIC as well as other electronic avenues that are now available and widely used, such as Google Scholar.

Part 2 is focused on quantitative design and analyses. Chapter 5 covers participant selection and sampling for quantitative investigations. The next two chapters are devoted to measurement because of the critical role it plays in quantitative and mixed methods educational research. Basic descriptive statistical principles are presented first to enhance understanding of measurement. For example, I have found that students must know about correlation to understand reliability and validity. Nonexperimental designs are presented in Chapter 8, followed by the chapter on experimental designs. Chapter 9 also includes the most comprehensive list of threats to internal validity in the field. The last chapter in Part 2 is focused on a conceptual understanding of inferential statistics and effect size.

Part 3 includes three chapters that cover qualitative research. Chapter 11 presents major qualitative research designs (including a unique explanation of threats to the validity/trustworthiness of results); Chapter 12 has expanded coverage of qualitative data collection; and Chapter 13 is devoted to qualitative data analysis and reporting. Overall, the chapters increase coverage of qualitative research from previous editions.

Part 4 includes both mixed methods and action research, and **Part 5** contains an entirely new chapter on writing research proposals, reports, and manuscripts to be submitted for publication.

As in the previous editions, the chapters include numerous pedagogical aids to facilitate learning essential skills and knowledge:

- **Learning Outcomes** are presented at the beginning of each chapter to help students focus on key concepts and principles.
- **Chapter Concept Maps** are used as an advanced organizer.
- **Key Research Terms** are highlighted in the text and at the end of each chapter.
- A **Glossary** is now included to facilitate understanding of key terms.
- **Check for Understanding Questions**, aligned with **Learning Outcomes** and answered at the end of each chapter, provide students with practice demonstrating knowledge.
- **Discussion Questions** facilitate discourse of important topics.
- **Application Exercises** encourage students to extend their learning.
- **Author Reflections** bring insights and perspective.
- **Excerpts** from published research articles illustrate how research principles are reported.
- **Full annotated published articles.**
- **Consumer (and Researcher) Tips** emphasize the skills needed to judge studies critically.

New to the Eighth Edition

There are many significant changes and additions to the eighth edition, **including two new chapters (Chapter 13: Qualitative Data Analysis, Validity/Trustworthiness, and Reporting and Chapter 16: Writing Research Proposals, Reports, and Articles)**. The sequence of topics has remained unchanged from the seventh edition, but there have been some important modifications in many chapters. Some of the more significant changes, in addition to updating each chapter, include the following:

- A **new chapter** (Chapter 13) on **qualitative data analysis, validity/trustworthiness, and reporting**. This chapter provides more extensive coverage

of qualitative data analysis, with new material on how to report results from qualitative studies. This additional chapter better balances qualitative with quantitative research design and analyses.

- A **new chapter** (Chapter 16) on **writing research proposals, reports, and articles**, with guidelines for scholarly writing, academic voice and tone, elements of style, formatting, and **new APA style recommendations for using inclusive language**. Separate sections emphasize quantitative, qualitative, and mixed methods documents.
- **Greater emphasis on how to conduct research.**
- **Expansion of the *Signal and the Noise* metaphor**, incorporating the metaphor throughout the text.
- A **new *Hedgehog and Fox* metaphor**, illustrated in each chapter to show the difference between simplistic and more sophisticated, nuanced thinking.
- **New Chapter Concept Maps.**
- **New Learning Outcomes** listed at the beginning of each chapter, keyed to **new Check for Understanding Questions** throughout each chapter (**with answers at the end of each chapter**).
- **Increased number of Author Reflections** (Students have found my author reflections engaging, drawing upon my years of experience teaching, conducting, and publishing research).
- **New coverage of major research paradigms.**
- **New emphasis on implications of Big Data for research.**
- **Inclusion of the 2018 Common Rule revisions for ethical research.**
- **New Listings of Key Terms for all chapters.**
- **New Glossary of definitions of key terms.**
- **Mostly new excerpts from published research articles to illustrate concepts and research writing styles.**
- **More diagrams and figures to aid student understanding.**
- **More references.**
- **Greater emphasis on:**
 - use of Google Scholar for literature searches
 - the importance of replication in research
 - alignment of research questions to methodology
 - sensitivity in selecting samples
 - sample description
 - electronic data gathering

- inclusion of dosage as a threat to internal validity
- qualitative data collection
- writing qualitative research questions and subquestions
- validity and trustworthiness in qualitative research
- recursive analysis, reflective procedures, and pattern-seeking in qualitative research
- reporting qualitative research
- practical significance

Supplements

A full complement of supplements further enhances and strengthens the eighth edition.

Pearson eText, Learning Management System (LMS)-Compatible Assessment Bank

With this new edition, all assessment types—quizzes, application exercises, and chapter tests—are included in LMS-compatible banks for the following learning management systems: Blackboard (9780137355297), Canvas (9780137355334), D2L (9780137355341), and Moodle (9780137355303). These packaged files allow maximum flexibility to instructors when it comes to importing, assigning, and grading. Assessment types include:

Learning Outcome Quizzes Each chapter learning outcome is the focus of a Learning Outcome Quiz that is available for instructors to assign through their Learning Management System. Learning outcomes identify chapter content that is most important for learners and serve as the organizational framework for each chapter. The higher-order, multiple choice questions in each quiz will measure your understanding of chapter content, guide the expectations for your learning, and inform the accountability and the applications of your new knowledge. When used in the LMS environment, these multiple-choice questions are automatically graded and include feedback for the correct answer and for each distractor to help guide students' learning.

Application Exercises Each chapter provides opportunities to apply what you have learned through Application Exercises. These exercises are usually short-answer format and when used in the LMS environment, a model response written by experts is provided after you submit the exercise. This feedback helps guide your learning and can assist your instructor in grading.

Chapter Tests Suggested test items are provided for each chapter. When used in the LMS environment, true/false and multiple-choice questions are automatically graded.

Instructor's Manual

The **Instructor's Manual (0135769876/9780135769874)** is provided as a Word document and includes resources to assist professors in planning their course. In addition, this manual includes test items for each chapter.

PowerPoint Slides

PowerPoint® Slides (0135769795/9780135769799) are provided for each chapter and highlight key concepts and summarize the content of the text to make it more meaningful for students.

Note: All instructor resources—LMS-compatible assessment bank, instructor's manual, and PowerPoint slides are available for download at www.pearsonhighered.com. Use one of the following methods:

From the main page, use the search function to look up the lead author or title. Select the desired search result, then access the "Resources" tab to view and download all available resources.

From the main page, use the search function to look up the ISBN (provided above) of the specific instructor resource you would like to download. When the product page loads, access the "Downloadable Resources" tab.

Acknowledgments

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on my organization, writing, examples, approach, and materials, as well as to the chapter co-authors, who have provided much-needed expertise.

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I am grateful to the staff at Pearson, especially Curtis Vickers and Leza Young, who have been exemplary in their editing and production of the book.

As this is being written, further ideas are germinating for possible changes in organization and content for the ninth edition. Please write with any suggestions. Your comments will be most helpful.

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To the Student

It was some time ago that I sat, somewhat nervously, in a university auditorium waiting for my first class in educational research (perhaps you have had or will have similar feelings). It was taught by Irv Lehman at Michigan State University. I remember this initial class session vividly. I distinctly recall thinking, given what I had heard about “research,” that I needed to learn only enough to pass the course and would not have to worry about it again! It was another hurdle that I was forced to jump to graduate. I was not bad in mathematics, but my interest was in working with people, not numbers. I certainly never thought that I would someday teach and write about educational research. But something happened to me as I sometimes struggled through the course. What I discovered was that research is a way of thinking, a tool that I could use to improve the work I do with other people, and to enhance student learning and motivation. My hope is that this book can instill similar dispositions for you,

providing knowledge, skills, and attitudes to improve your life and the welfare of others.

Although learning the content and skills needed to become an intelligent consumer or producer of research is not easy, my experience in teaching hundreds of students is that you will improve yourself, professionally and otherwise, through your efforts. In the beginning, especially as you read published research articles, not everything will make sense. No worries, that is part of the learning process. As your experience in being an informed consumer and researcher increases, so will your understanding. Many of my students have commented on how “things came together” as the course progressed.

Good luck and best wishes, and please write to me or e-mail me if you have any questions about the content or suggestions for improving the book.

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Part I

Getting Ready for Research



We begin our journey with an introduction to what research is all about and how to frame good research questions. This involves an understanding of the nature of disciplined inquiry, types of research, and how empirical studies are located and evaluated.

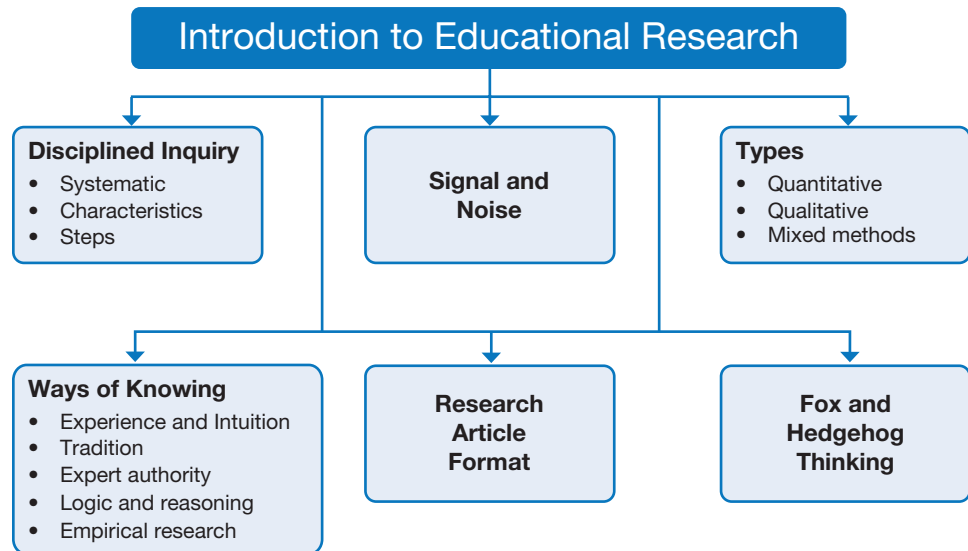
Chapter 1 introduces two metaphors that will be used throughout the text: *The Signal and the Noise*, and the *Fox and the Hedgehog*. As you will see, the Signal and the Noise represents what we want to know (the signal) and what gets in the way of finding it (noise). Keeping this metaphor in mind helps focus on the varied difficulties of conducting research in applied, complex contexts like schools and classrooms. The Fox and the Hedgehog represent different dispositions about how we think about research. *The Fox and the Hedgehog* is used throughout the chapters to illustrate primitive thinking (hedgehog-like) from sophisticated thinking (fox-like).

Ethical principles are covered in Chapter 2 as foundational to conducting research that is responsible and in the best interests of participants.

Chapters 3 and 4 focus on two steps in the research process—forming research questions and reviewing related literature—that set the foundation for designing appropriate procedures for collecting and analyzing data. These are fundamental initial phases in the research process. You will find that access to research literature is relatively easy. The challenge is to separate what is good research from studies that lack credibility, and synthesize a number of studies into a coherent argument that supports a particular research design.

Chapter 1

Introduction to Research in Education



✓ Learning Outcomes

- 1.1 Know how the purpose of research, finding the signal, is influenced by noise that distorts what is reported.
- 1.2 Explain why empirical research is important as an approach to generating and applying knowledge.
- 1.3 Know the characteristics of major research paradigms.
- 1.4 Understand how the principles of disciplined inquiry (“fox-like” thinking) are important for conducting educational research.
- 1.5 Distinguish among key characteristics of quantitative, qualitative, and mixed methods types of research.

Chapter Road Map

We begin our journey with a metaphor—The Signal and the Noise—to introduce what educational research is all about. After a discussion of why research is important, different ways knowledge can be identified and constructed are elucidated. This is followed by a focus on how and why characteristics of systematic inquiry, based on principles for conducting research, compose the foundation for obtaining high-quality studies. We then turn to overviews of qualitative, quantitative, and mixed methods approaches to educational research and designs, with an example of a published article.

The Signal and the Noise

Learning Outcome 1.1 Know how the purpose of research, finding the signal, is influenced by noise that distorts what is reported.

You may well be familiar with this metaphor: *The Signal and the Noise*. In science and engineering the signal-to-noise ratio compares the desired meaningful information (the “signal”) to the amount of background “noise” that makes the signal less clear. In his delightful book, *The Signal and the Noise: Why So Many Predictions Fail but Some Don’t*, Nate Silver (2012) shows how the metaphor applies to many if not most fields, including sports, politics, weather, even wars, and other domains where we often have a great amount of data but still regularly miss the mark. When applied to education, as we will see throughout the book, the sources of noise are even more plentiful than in other fields! For me, this metaphor makes perfect sense as a way to conceptualize the research process, as well as what makes educational research challenging.

The *signal* is what is correct, actual, and true, what we can be certain of when making conclusions about what we understand, what we claim to know, and our predictions and insights. The *noise* is composed of factors that drown out, distort or dilute the signal, such as a poor connection in making a video transmission that clouds the image. In educational research, examples of noise include confirmation bias, random error, and poor methodology. That is, noise manifests itself in flawed, incomplete thinking so that the conclusions that result from research are unlikely to represent the actual signals.

I’ve illustrated the signal/noise metaphor in Figure 1.1. The idea is that while there is a true or correct signal, what you see as a result from doing research, the *observed finding*, is a combination of the true signal and noise that is always part of the process of conducting research. If represented by a conceptual equation, it would look like this:

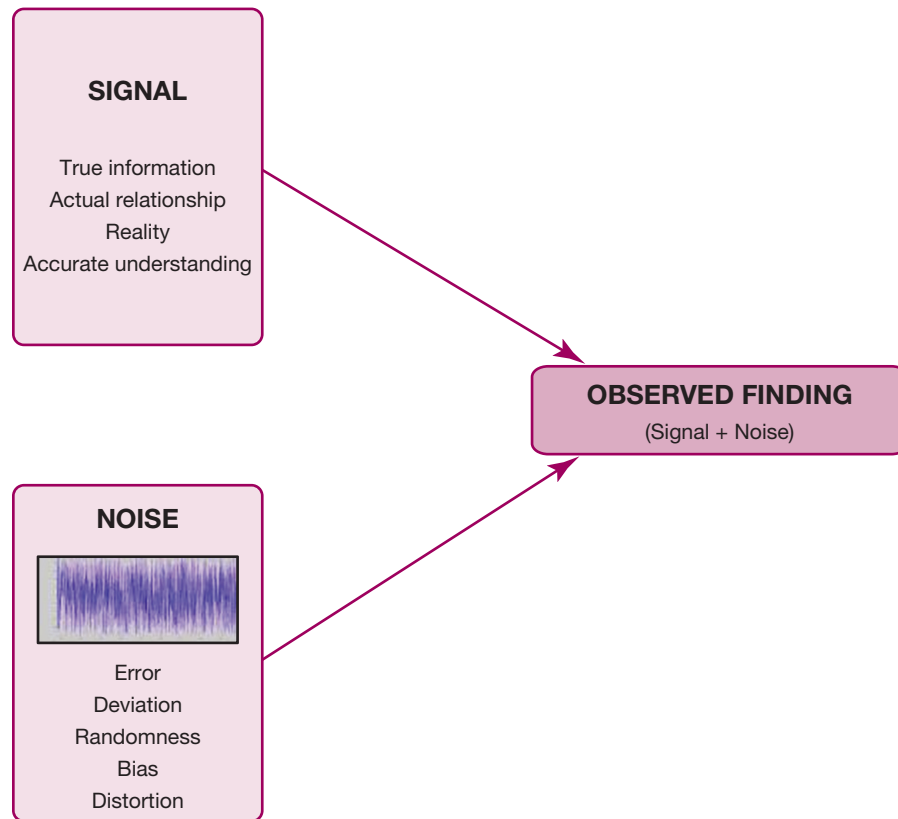
$$\text{Observed Finding} = \text{Signal} + \text{Noise}$$

As a researcher you only see the observed finding, which results from the signal *plus* noise. The greater the noise, then, the less likely that the observed finding is the same as the signal. As the noise is reduced, the observed finding is closer to the signal, which, of course, is what you want. Good research is able to identify and mitigate sources of noise so that the observed finding is close to the signal. Noise, then, is distinguished from the signal as separate determinants of the observed finding. For example, if a

survey is used to describe reasons students give for why they are not fully engaged in college, the signal would be the true or real reasons; the noise could be the unreliability of the survey and/or sampling bias.

A major emphasis in this book is to know about, identify, and control sources of noise, depending on the nature of the research design. This includes sources of “error” in making qualitative judgments as well as limitations due to sampling, measurement, and statistical analyses in quantitative studies. My point is that educational research, by its nature, is noisy (more so than in the sciences or psychology). To get to the signal as a researcher you must control that noise as much as possible. As a consumer, you need to know about how noise impacts what is found and appropriately temper conclusions.

Figure 1.1 The Signal and the Noise



With this metaphor in mind (hopefully soon deeply entrenched), let’s look at why educational research is important and how it can improve your life and the lives of those around you.

Check for Understanding 1

1a. How do the signal and noise affect a researcher’s *observed finding*?

Why Research?

This book is about helping you and others lead a richer, more satisfying life. That may seem like a strange beginning for a textbook like this, but I want to stress that there are good reasons for increasing your knowledge of research and the process of systematic inquiry. It is clear that research in education has made, and will continue to make, important contributions to our understanding of teaching and learning at all levels.

Like other professionals, you need to be able to read and interpret research to keep abreast of contributions to the field to make better decisions. Because the quality of educational research varies greatly, it is essential that you are able to make informed judgments about the credibility and usefulness of the studies. Since education is a complex, situation-specific endeavor, we must each make these judgments in our own context. A proper, balanced perspective on research will strengthen the judgments we make constantly in educational settings, and, in that way, touch the lives of many.

Figure 1.2 Use of Data in Decision Making?

Data Driven \rightleftarrows Data Deluged \rightleftarrows Data Doped? \rightleftarrows Deleterious Decisions?

Furthermore, teachers and administrators are increasingly involved in conducting research in their own classrooms, schools, and districts. They have found that even informal, small-scale studies can provide new knowledge and insights to help improve student learning.

Finally, there is a renewed interest at the national level to use “evidence-based” findings to evaluate programs and policy, and the ubiquitous admonition for “data-driven” decision making. The trend is to use research and evidence based on data (both quantitative and qualitative), whenever possible, to make decisions about effectiveness and to determine “what works” in schools. In fact, the need for educators to understand and use results from assessments and other measures has intensified. Just think about the difficult issue of using students’ academic progress to evaluate teachers. It is common now to use students’ test scores as indicators of learning and judge teachers on how much students improve or how they compare with the progress of other teachers’ students. A clear understanding of whether the data are reasonable, and the validity of conclusions about effective teaching, depends on knowing what constitutes good data and good data analyses for this purpose. In other areas, there is so much emphasis on “using data” that I am afraid that the sequence illustrated in Figure 1.2, moving from one end to the other, can sometimes result in disastrous conclusions (e.g., firing teachers on the basis of inaccurate low student test scores, or denying graduation on the basis of low scores from a flawed test).

At the same time, there is a surging interest in conducting research that is based on assumptions about knowledge that are very different from what we think of as “hard data” (e.g., objective results from quantitative measures and analyses). This has introduced new ways of thinking about research and expanded the types of “data” that are examined systematically to reach conclusions. So, in my view, it is best to think about “data” broadly.

I am confident that after reading, understanding, and conducting research in an informed, intelligent manner, you will enhance your professional and personal life, and the lives of others, with the following benefits:

- Developing critical thinking and evaluation skills to examine arguments and claims made by others

Author Reflection *Many of my students begin their study of research with hesitation and anxiety about the content (especially dreaded “statistics”). I tell them that’s fine, that my job is to alleviate the anxiety and instill a positive attitude about research. Like most of my students (I hope), you may find that you actually like research! I tell my students that if this happens it puts them in a rather unique group. I hope you will join this special group as well!*

- Enabling a more complete, more accurate understanding of and evaluation of claims based on data
- Improving understanding of educational research reports in the media, especially flawed claims
- Keeping up with recently reported knowledge of best practice
- Improving decision making about best practice
- Informing educational policy
- Fostering the ability to ask the right questions
- Understanding how to design and conduct research

Sources of Knowledge

Learning Outcome 1.2 Explain why empirical research is important as an approach to generating and applying knowledge.

Professional decision making is all about making judgments, and judgments are based on knowing. We “know” something when it is accepted as true or valid (the signal), when we can be fairly certain of its consequences. For example, good teachers seem to “know” when they are losing their students’ interest and need to change their method of instruction, when students need a strong rebuke or a soft reprimand, and how to phrase questions to elicit engagement from students. How do these teachers obtain or generate such knowledge? How do we come to “know” things?

In the field of research, we use the term **epistemology** to refer to the origin, nature, and limitations of different ways of accumulating knowledge. Each epistemology includes criteria that are used to justify what constitutes “knowing something” and beliefs. The different sources of knowledge described in this section are compared to empirical research. In the next section, epistemology is applied more specifically to research paradigms.

Experience and Intuition

It has been said that there is no substitute for experience, whether it is your own or someone else’s. In education, we rightfully depend a great deal on direct experience to know what works. Professionals become effective through practice, and teaching, counseling, and administering are no exceptions to this rule. However, imagine if experience were the *only* way to obtain knowledge, or if you were confined only to your own experiences and those of friends and acquaintances for coming up with reasonable signals. Not only would it be difficult to know where to begin practice, but it would also be difficult to know how to improve and how to handle new demands and situations.

There are other limitations to using our personal experiences as sources of knowledge. Much of our knowledge from experience depends on what we have observed and how we have interpreted it. As humans, though, we can—and do—make mistakes

in our observations. Sometimes, because we bring our own biases to a situation, we fail to see things that are clearly evident, and we make inaccurate observations and interpretations. Finally, because we are personally involved with our own interpretations, we have a natural inclination to protect our self-esteem and ego, and consequently our recollections may be distorted. When other types of knowing can be used to stimulate, inform, reinforce, challenge, and question our own experiences, the intuitive professional judgment that is absolutely essential for effective teaching and leadership is enhanced.

Tradition

Many things seem to be done “right” simply because they have always been done that way. Advice, rules, approaches to handling problems, and “right” and “wrong” answers are passed from year to year, from one group to another, as accepted truths. By accepting what has always been done as the best or right way, tradition mitigates the need to search for new knowledge and understanding. However, reliance on tradition makes accepting new knowledge difficult and may temper your desire to question existing practices. Traditions are also often based on myths or prejudices.

Experts’ Authority

People we consider experts or authorities in a particular field are major sources of knowledge. An authority has experience or unique expertise in something and is able to provide insights and understanding that we are unable to see. We depend on such authorities, whether they are doctors, lawyers, professors, teachers, or plumbers. However, as with personal experience and tradition, authority can also mitigate the accumulation of knowledge. Authorities can be wrong and/or biased, and the public has a tendency to accept as fact what are actually opinions.

In fields such as education, in which practice is heavily influenced by complex interactions among students, environments, and teachers, there is room for experts to disagree about what is known. Perhaps you have read one author who suggests one approach and another who suggests the opposite approach for the same situation or question. A good example is the evidence on the effectiveness of charter schools. In 2020, the year this book was revised, the effect of charter schools on student achievement was much debated. Some studies suggested that charter schools are more effective than traditional schools, but there was also research that showed little differential impact on achievement. Both sides of the argument were made by so-called experts and conducted by high-status centers, universities, and organizations. Furthermore, the sheer number of authorities in education can be confusing.

Logic and Reason

Sometimes we can be convinced that something is true because a logical argument is made and defended, and sound reasoning is used to reach a conclusion. Logic and reason (rationalism) rely on accurate premises and foundational facts. However, logic and reason are only as good as the facts and premises that are used. There is a well-known saying that applies here to databases and computer programs that analyze data and generate results: “garbage in, garbage out.” Logic and reason are essential in conducting and reporting research, but these operations must be done before and after a careful gathering of facts.

Empirical Research

In contrast to experience, intuition, tradition, experts' authority, and logic and reason, **empirical research** involves a systematic process of gathering, interpreting, and reporting information. Empirical research is characterized by *disciplined inquiry*, by accepted principles to verify that a knowledge claim is reasonable. Defined in this way, research is not simply going to the library, gathering information on a topic, and doing a research paper. Rather, information (data) is gathered directly from individuals, groups, documents, and other sources and used to come up with conclusions that contribute to knowledge. **Educational research**, then, is empirical, a *systematic, disciplined inquiry applied to gathering, analyzing, and reporting information that addresses educational problems and questions*. *Systematic* means that there are accepted conventions, rules, and procedures for the way studies are conducted and standards for judging quality.

Here are some of the characteristics of this kind of inquiry:

- *Skepticism* about claims—having a healthy, productive distrust of findings
- *Control of personal bias* so a researcher's personal prejudices, beliefs, desires, and attitudes do not result in distorted conclusions
- *Precision* to provide detailed, clear definitions, descriptions, understandings, and explanations
- *Parsimony* to provide the least complicated explanations
- *Tentative conclusions* that are open to change
- *Verification* of findings through replication, when possible
- *Openness to scrutiny* by others (the public)
- *Logic*, inductive and/or deductive, to provide meaning

Why is it important to know about knowing? It turns out that each approach to knowing constitutes a researcher's philosophical orientation, which has consequences for what questions are asked, methodology, how results are interpreted, and conclusions. An awareness of these underlying philosophies will help you plan your own research and understand others' research. For example, if you believe that your own experience is your best source of knowing how to teach, there would great reliance on being aware of how your methods impact students, with self-reflection and an emphasis on an accumulation of experience over time. This way of knowing would be very different from an empirical research approach that seeks to gather data systematically and take a skeptical, questioning perspective about what the data mean.

In characterizing research, it is useful for you to think about two major fields of study that have contributed important knowledge and insights: social science and humanities. The traditions of social science empirical research are grounded in years of studies in disciplines such as psychology, sociology, economics, political science, and anthropology, all of which conduct empirical research to study society, individuals, and groups. Another tradition of research is humanities oriented. This kind of research, which could also be called *analytical*, is based on scholarship in disciplines such as linguistics, history, jurisprudence, philosophy, and religion, as well as some subdisciplines, such as cultural anthropology, and critical arts-based and narrative forms of research—all of which are important in making contributions to knowledge, and all of which contain the essential feature of systematic inquiry. In this book, the focus is on social science methods of empirical research, as distinguished from humanities-oriented research.

Check for Understanding 2

- 2a. How is empirical research different from other ways of knowing?
- 2b. What are three characteristics of systematic inquiry?
-

Now on to a discussion of research paradigms. These elegantly labeled approaches are important because they undergird different methods of empirical research as well as how results are interpreted.

Research Paradigms

Learning Outcome 1.3 Know the characteristics of major research paradigms.

A **research paradigm** is a “world view,” a way of thinking about the world, a belief system. It includes philosophical assumptions, shared beliefs, and a theoretical framework about the world and knowledge that guide thinking and methods employed in empirical research. As such, each paradigm is a lens through which research is conducted and interpreted. They influence the motivation for research, what should be studied, criteria for judging research, conceptual framework, methods, and intended use of results. Because most educational research conducted and reported in the 20th century was based on research methods in psychology, which in turn was based on the natural sciences, for a long time a single paradigm, positivism, was what was taught and used. Beginning in the 1970s that changed. There are now four major paradigms used in educational research.

Author Reflection *If you Google “research paradigms” you’ll actually find that there are various terms used, and that different authors disagree about how to label and define different paradigms, in part because they are philosophies. This is frustrating, to say the least! What I’ve summarized here is my judgment about the best way to approach it for educational research.*

Postpositivism

You can think of **positivism** as being synonymous with the scientific method. The main assumption of positivism, for education, is that phenomena can be studied like the natural sciences, using observation, measurement, quantification, and objectivity to establish cause-and-outcome relationships. The successor to positivism, which occurred after World War II, was postpositivism. **Postpositivism** reflects the reality that human behavior doesn’t lend itself as much as the hard sciences to pure empiricism, objectivity, and laws of nature. Postpositivists believe more in probability than certainty, using objective methods in concert with other, more intuitive judgments about the nature of causation. It basically takes a more holistic, less reductionist view of research, but it is still very much wedded to the value of objectivity, measurement, quantification, law-generation, and other characteristics of the scientific method. As such, postpositivism today is sometimes described as synonymous with quantitative research. My view is that the term *quantitative* reflects the methodology inherent in postpositivist research.