2 OVERVIEW OF THE EDUCATIONAL RESEARCH PROCESS

STUDENT LEARNING OBJECTIVES

After studying Chapter 2, students will be able to do the following:

2.1   Describe why the various activities included in planning a research study are so critical to the conduct of the study itself.

2.2   List and describe examples of techniques for collecting qualitative and quantitative data.

2.3   Describe the importance of results, conclusions, and recommendations in a research study.

2.4   Summarize various activities that must be conducted during each step of the educational research process.

INTRODUCTION

In Chapter 1, we looked briefly at the general process of conducting an educational research study. We outlined the main steps as follows:

- Identifying an existing problem
- Clarifying and specifying the problem
- Formulating research questions concerning the central problem
- Reviewing related literature
- Determining and carrying out procedures for data collection and analysis
- Stating the findings as determined through data analyses
- Developing conclusions and recommendations related to the original research question

However, it is critical at this time that we begin to examine these steps more *specifically*, as each step contains particular subcomponents. The focus of this chapter is to introduce the steps necessary in conducting educational research. The steps in the process are listed, followed by the corresponding chapters of this book that address the topic:

1. Identifying and limiting a research topic or problem (Chapter 3)
2. Formally stating and refining research question(s) (Chapter 3)
3. Reviewing existing literature related to the problem (Chapter 5)
4. Writing a literature review (Chapter 5)
5. Developing a research plan (Chapters 6–10)
6. Implementing the research plan and collecting data (Chapters 11 and 12)
7. Analyzing those data (Chapters 11 and 13)
8. Stating findings, conclusions, and recommendations in a written research report (Chapter 14)

This process is depicted in Figure 2.1. It is important to note, once again, the cyclical nature of educational research. Notice how the outcomes or results of one study can logically and informatively lead into the next phase of educational research. This figure is certainly not meant to imply that educational research is a linear process. As you read in Chapter 1—and, specifically, saw depicted in Figure 1.1—aspects of one study (e.g., conclusions, methods, literature reviews) may influence and guide subsequent studies.

FIGURE 2.1 ■ **The Educational Research Process**
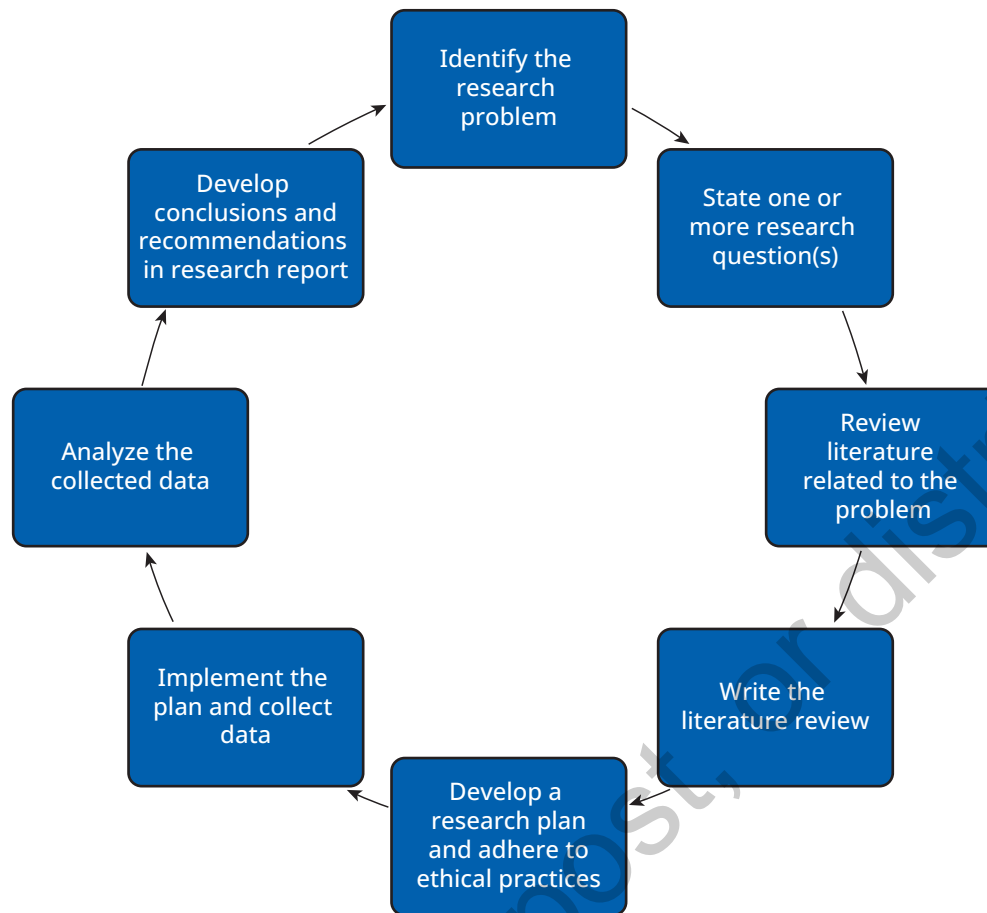
PLANNING THE RESEARCH STUDY

There are several important key steps that the researcher must address before an actual study can be conducted. These activities include identifying a research topic or problem, stating the guiding research questions, reviewing related literature, writing the review of literature, and developing a concrete plan for conducting the research study.

Identifying and Limiting a Research Topic or Problem

The first—and arguably most critical—decision for any educational research study is exactly *what* to study. Often, personal and professional experiences lend themselves to the identification of educational research topics. For those of us who conduct educational research studies, we typically choose topics we have some previous experience with or exposure to. Topics for educational research studies should hold a good deal of personal interest for the researcher. If for no other reason, you are going to spend several months, if not years, researching the topic—so it most definitely should pique your interest. Personal interest, therefore, is a huge factor in deciding on an initial topic for educational research.

That being said, of course, there is likely nothing more important in terms of identifying an initial topic for research than an existing need. If a need is determined, then there is a purpose or goal for the research, and there is likely an audience interested in the results of a given research study. A need for research on a particular topic may stem from prior research conducted on that topic. It may also arise from the various experiences of practitioners in the field related to the topic. Therefore, current and future research, as driven by this identified need, should likely make a contribution to the body of research in a particular field of study.

Another key factor in identifying a topic for a research study is verification that the potential topic is, in fact, a genuine problem. In other words, the researcher has a responsibility to provide a rationale for why this particular topic or problem is worthy of being studied. Arguably, the majority of the evidence for this justification and rationale is in the body of related research literature. The literature review should have a strong influence on the identification, specification, and articulation of the research problem. Similarly, specification of a particular research problem in subsequent cycles of research may be guided by various aspects of previously conducted research studies.

Other important factors include manageability and time. When conducting educational research studies, it is important to keep the ultimate goal in mind. Remember, the basic goal of nearly all research studies is to find answers to questions, or to help explain and understand some educational phenomenon. For example, if you are planning to conduct a research study and know that you must have it completed in roughly four to six months, knowledge of that fact contributes a great deal to decisions about the specific topic you wish to research. Similarly, exposure to and familiarity with various research designs can be a great benefit when trying to gauge the manageability of researching a particular topic. Suggestions for identifying and narrowing the focus of educational research studies, along with other initial considerations, are discussed more extensively in Chapter 3.

Formally Stating and Refining Research Question(s)

Once the research topic or problem is clearly identified, the next step is to formally state one or more research questions. Research questions should be (relatively) concise and stated in a very clear and focused manner. Carefully wording a research question is a critical aspect of conducting educational research because the research question is what guides the remainder of the study. For example, it guides the data that are collected, the strategies for data analysis, and the ultimate conclusions and recommendations at the end of the study. In addition, care must be taken to ensure that the question is actually answerable by data the researcher is able to collect. Failure to do so may result in the collection of inaccurate data, or perhaps data that do not parallel or align with the research question. In cases like these, unfortunately, you do not find out about the misalignment until the end of the study—when it is too late to restate your research question. Further discussions related to formally stating research questions and how to refine those questions so that they accurately "fit" with the rest of a given study—including sample research questions—appear in Chapter 3.

Reviewing Existing Literature Related to the Problem

Examining existing research studies can provide a great deal of background information and guidance to the identified problem that is the focus of the research study. "Related literature" can be loosely defined as any existing source of information that sheds light on the topic under investigation. These sources might include publications, such as professional books, research journals, or unpublished research reports. Although there is really no limit to what can be used as background information on a given research topic, care must be taken to evaluate the existing literature against several criteria. These criteria include, but are not limited to, the following: the objectivity of the published research (and/or the extent to which an author has clearly identified and explained any potential bias); the specification of limitations inherent in the study; whether the research constitutes a *primary* (i.e., written by the individual who actually conducted the research) or *secondary* (i.e., someone's interpretation of another's research) source; whether the research is *empirical* or opinion based; and whether it was subject to a process of peer review.

Reviewing related literature is a critical part of any research study because it can inform so many aspects, including the specification of the problem, development of the research questions, and determination of research designs and methodologies. Suggestions and techniques for reviewing related literature are presented in Chapter 5.

Writing a Literature Review

For many researchers, one of the more challenging aspects of conducting a research study—and writing a research report—is writing a formal review of related literature. Compiling and synthesizing

literature related to a given topic is not always as straightforward as it might seem. Adding to that challenge is the fact that every topic is different, especially in terms of the existing body of literature. Further, there is no "magical formula" that anyone can share with you regarding how to develop and formally write a review of literature. That being said, however, guidance regarding the development of a literature review can still be provided to the novice researcher. Suggestions and recommendations for writing a formal literature review are discussed in Chapter 5.

Developing a Research Plan

Specification of the research problem, development of research questions, and a thorough review of the existing body of literature provide the necessary groundwork to begin developing a plan to conduct an educational research study. The next step in the process is to specify exactly *how* a study is to be conducted by answering several key questions related to the research plan, also known as the **research methods**:

- What data will be collected?

- Will those data be qualitative, quantitative, or both?

- Do the data already exist, or will original data be required?

- Will it be necessary to develop instrumentation (e.g., a survey or rating scale) or interview protocols?

- How and when will the data be collected?

- How will the quality of the data be ensured?

- If the data need to be collected from human participants, from whom will they be collected?

- How many participants will be necessary?

- What techniques will be used to analyze those data?

- Do all of the above align well with the research question(s)?

Additionally, care must be taken to ensure that all participants in your study are being treated ethically (see Chapter 4) and that your study has been approved by the appropriate review board (Chapter 4). Much more information regarding various research designs and the decisions related to a specific methodology are discussed in Chapters 6 (qualitative methods), 7 (quantitative methods), and 8 (mixed methods).

IMPLEMENTING THE RESEARCH STUDY

Once the plethora of decisions outlined in the previous section are made—and aligned appropriately with the research questions—it is time to implement the research plan and physically collect and analyze data.

Implementing the Research Plan and Collecting Data

Fraenkel, Wallen, and Hyun (2023) suggest three broad categories of data collection techniques. First, data can be collected through the *observation* of participants in the study. These participants might include students, teachers, parents, administrators, or any combination of those groups of individuals. Observational data can be collected through the use of field notes, journals, or even videotaping.

A second category of data collection techniques involves collection of data by means of *questionnaires, surveys,* and *interviews* with any of those groups of individuals involved in the educational process. Questionnaires and surveys can be used to ask individuals about their personal opinions or perspectives on some aspect of the educational process under investigation. These can be collected through pencil-and-paper or electronic formats. Similarly, interviews can be used as a means to collect data in an oral question-and-answer exchange between the researcher and participants in a study.

The third category of data collection techniques involves the examination of *existing documents* or *records*. Often, collection of existing data requires the least amount of time, since they have already been collected; it is the job of the researcher merely to *locate* those data. However, this process is not always so simple. Often, it may be difficult to physically locate these data, especially if a good deal of time has elapsed since their occurrence. Examples of existing documents might include attendance records, minutes of faculty meetings, policy manuals, and student portfolios—the list of existing data in schools is seemingly endless.

I typically add a fourth category of data collection techniques, composed primarily of quantitative measures, such as checklists, rating scales, tests, and other formal assessments that are routinely administered in schools. Often, if we want to look at the effectiveness of instruction, for example, we may want to look at assessments administered to students.

Of course, within this category, we would also include scores resulting from the administration of standardized tests. It is important to recognize that the reader may see some overlap with the previous category of existing documents. This is certainly a reasonable perspective, as many quantitative measures that exist in schools naturally occur as part of the educational process. However, these are certainly realistic—as well as important and meaningful—sources of educational research data.

More specific information regarding various data collection techniques, instruments, and examples is provided in Chapters 11 (qualitative data collection techniques) and 12 (quantitative data collection techniques).

Analyzing the Data

Analysis of data occurs at different points in the process, depending on whether the study uses quantitative, qualitative, or mixed-methods designs and techniques. In quantitative research studies, data analysis typically occurs following the completion of *all* data collection. Once all data are collected and organized appropriately (i.e., to correspond to the research questions and the intended analytical techniques), those data are then subjected to appropriate analyses through the use of some statistical analysis software program (e.g., SPSS, Excel, StatCrunch). Quantitative analysis of data is a very objective process; since the analysis is actually being done by computer software, the subjectivity and potential biases of the researcher do not impact the results. In other words, regardless of who analyzes the data, the results will be identical—although it is important to realize that there may still be a good deal of subjectivity when it comes to *interpretation* of the statistical results.

In contrast, during qualitative research studies, data analysis typically begins *during* data collection, continues throughout the *remainder* of the process of collecting data, and is completed *following* data collection. It is common for initial rounds of qualitative data analysis to necessitate the collection of additional or different qualitative data, to help fully answer the research question(s). The analysis of qualitative data is, by definition and design, a highly subjective process. In contrast to quantitative analyses, qualitative analyses are not conducted via a computerized (i.e., "nonhuman") process. Of course, computer software is available for *assisting* with coding in the transcription process; however, qualitative analyses are conducted exclusively by the human mind. Generally speaking, this technique consists of categorization based on logical analysis. The practice of *polyangulation* is critical during this analytical process. The researcher must read, reread, organize, condense, and synthesize all the qualitative data in an attempt to identify themes, categories, or patterns that emerge from those data. It is not uncommon—in fact, it is quite typical—for multiple researchers to arrive at very different results and conclusions after analyzing even a small set of qualitative data.

In essence, the analysis of data in mixed-methods research studies capitalizes on the best of both of the "data analysis worlds." While the techniques for analyzing quantitative data and those for analyzing qualitative data within a mixed-methods study are the same as described earlier, the researcher must engage in a different sort of polyangulation to "merge" both kinds of data. By engaging in this process, the researcher gains a better understanding of how qualitative data and subsequent analyses can inform quantitative data analyses, and vice versa.

Discussion and examples of various data analysis techniques and procedures are provided in Chapters 11 (qualitative data analysis techniques) and 13 (quantitative data analysis techniques).

COMPLETING THE RESEARCH STUDY

Once all data have been analyzed, the researcher then must interpret the results to state findings, draw conclusions, and make recommendations for practice and future research. As a culminating activity in this process, a written report of the research study is typically produced.

Stating Findings, Conclusions, and Recommendations in a Written Research Report

Once data analysis has been completed, the researcher has the responsibility of formally and succinctly stating the *results*, also known as *findings*, as well as *conclusions* and *recommendations* resulting from the study. This is the point in the study where the researcher actually provides answers to the originally stated research questions. However, this step in the process is not quite as simple as that. The researcher must then take the answers to research questions and contextualize them with respect to the broader field of education, the context of the study, the setting of the study, and so forth. In other words,

- What do the findings *mean* to the field of education?

- What are the *implications* for practicing educators?

- What *impact* might they have on students and parents?

Further,

- What *recommendations* for practice can be made?

- What *recommendations*, if any, regarding educational theory can be made?

With respect to a final written research report, this section potentially carries the most weight. Most readers of educational research reports look to the substantive meaning of the researchers' final conclusions and recommendations drawn from the study. Although they read the entire written report, this is a situation somewhat similar to when a person skips ahead to the last chapter of a novel to see how the story ends.

One additional—and vitally important—aspect of developing conclusions and recommendations is that they *must* follow logically from the research questions, the data that were collected, and the results of the analyses of those data. In other words, care must be taken so that conclusions and recommendations do not become so global that they extend beyond the parameters of the particular study. Recommendations and advice for developing a final written report on completion of an educational research study are provided in Chapter 14.

THE EDUCATIONAL RESEARCH PROCESS—A BRIEF EXAMPLE

Now that we concisely examined each of the eight steps involved in conducting an educational research study, let us consider the following example (adapted from Mertler, 2020), where each step of a fictitious research study is briefly described. Our example begins with two researchers from the local university—one of whom specializes in social studies education and the other in research methodology. The social studies expert has noticed for some time that high school students across the state are not performing well in the state-mandated American history course. The course has always been taught in a traditional manner—with the content coverage beginning prior to the American Revolution and ending with more recent events. The social studies expert believes that there may be some merit in examining a "backward" approach to teaching history (i.e., beginning with current events and proceeding back through time to end at the American Revolution). He wants to investigate these two different instructional approaches and decides to enlist the help of a research methods colleague; she willingly agrees.

Step 1: Identifying and Limiting a Research Topic or Problem

The two researchers meet on a couple of occasions over the summer to identify the specific topic they hope to address through the examination and trial of this alternative instructional approach. Based on previous research and knowledge, they believe that students struggle most in making connections between seemingly unrelated historical events. The social studies expert argues that perhaps this backward approach (i.e., beginning with more recent historical events that students are more familiar with) will have a positive impact on how well they are able to make these types of connections. The researchers decide to focus their attention on any differences in academic performance, as well as students' attitudes, related to the two instructional approaches.

Step 2: Formally Stating and Refining the Research Question(s)

Now that they narrowed the focus of their study, the researchers must formally state the research question that will guide them. They identify the key variables in their study as follows:

- Independent variable: instructional technique (i.e., forward vs. backward instruction)

- Dependent variables: performance on the state's end-of-course exam; students' attitudes and perceptions

Based on the identified problem, as well as the key variables in the study, the researchers state the following research questions to guide their study:

1. Is there a difference in students' academic performance, dependent on the type of instruction received in an American history course? If so, what is the direction and size of that difference?

2. What are the students' attitudes toward and perceptions of these two types of instruction?

Step 3: Reviewing Existing Literature Related to the Problem

Although they are somewhat familiar with research in this area, the researchers decide to collect related, published research focused on the effectiveness of backward approaches to teaching historical, chronological events; how other history teachers implemented this type of instruction; and any problems they encountered. They decide to split the tasks, with the social studies expert identifying and reviewing published research studies on the topic and the methodologist identifying and reviewing studies that examined differential instructional methods. After reviewing their respective bodies of literature, the two researchers revisit the research questions to determine if they are still appropriate or should be revised, as potentially influenced by the existing body of research.

Step 4: Writing a Literature Review

After a few months of identifying, collecting, reading, and synthesizing existing research on the topic, the researchers pool their resources and collaboratively draft a comprehensive literature review. Their formal review of related literature includes the following subtopics:

- Instructional methods

- Methods of teaching history

- Chronological methods of teaching history

- Differential effects of chronological teaching methods

- Student opinions of chronological teaching methods

Step 5: Developing a Research Plan

Following the review of published literature, the researchers have ample background evidence and support for the focus of their proposed study (i.e., the backward approach to instruction can be

effective), although they also found some contradictory evidence (i.e., this approach is less or at least no more effective than the traditional approach). The researchers decide that the most appropriate design for their study is a comparative-type design, since the goal is to compare academic performance and attitudes of students taught using the forward approach with those of students taught using the backward approach. More specifically, they decide to use a mixed-methods design, where academic performance (i.e., Research Question #1) is measured quantitatively and student attitudes (i.e., Research Question #2) is measured qualitatively.

Step 6: Implementing the Research Plan and Collecting Data

Next, the researchers need to identify a couple of schools and several American history teachers in each. Several of those teachers will serve as the "comparison" group (i.e., they will teach their classes using the typical forward chronological method), whereas another set of teachers will serve as the "treatment" group (i.e., they will teach their classes using the backward approach). Further, they decide that the study will span an entire academic year, with the majority of data collection occurring near the end of the school year. The end-of-course exam in American history is administered in April; they will also survey the students at about the same time. They will use the school year to check in periodically with the teachers and to develop the qualitative attitude survey—containing open-ended questions—for students.

By the end of May, the student scores on the American history exam have been received from the state department of education. The researchers have also surveyed all the students involved in both groups of the study.

Step 7: Analyzing the Data

Immediately following the end of the school year, the researchers begin their data analysis. Test scores resulting from the administration of the end-of-course achievement test are statistically compared for the two groups (i.e., the backward group vs. the forward group). Upon interpreting the results of the analysis, it is determined that the test scores of the students who were taught using the backward instructional approach are significantly higher than those of the students taught in the more traditional manner.

The analysis of student perception data—and subsequent qualitative comparisons between the two groups—reveals some interesting results. Generally speaking, the students taught using the backward approach liked it, but they identified that this was largely because it was something different from what they were used to in a history course. They felt that they had a hard time adjusting to the different approach to studying history. Those taught using the forward approach liked the idea of being taught in the alternative manner but were apprehensive because they thought the material would be more difficult to grasp.

Step 8: Stating Findings, Conclusions, and Recommendations in a Written Research Report

With their findings in hand, the researchers develop conclusions and recommendations as part of a final written research report. They conclude that, while the backward instructional approach resulted in better academic performance, the students seemed very uncomfortable with the alternative method. They agree—and formally recommend—that it is imperative to continue studying the effectiveness of this approach in subsequent academic years, perhaps with a larger number of schools, teachers, and students. An additional recommendation includes the collection of data from teachers (i.e., What were their experiences and perceptions of the different teaching method?). Similar findings in the coming years could provide a much stronger case for permanently changing the approach to teaching American history—if, in fact, future data supported that recommendation.

DEVELOPMENTAL ACTIVITIES

1. From your brief introduction to educational research methods, which of the eight steps of the educational research process do you believe would be the most difficult to carry out, in general or for you personally? Why?

2. In Chapter 1 Developmental Activities, you brainstormed several possible topics for educational research studies. Select one of these topics and *briefly* outline how you would conduct this educational research study, corresponding to the eight steps presented in this chapter.

3. Revisit the sample study presented in the chapter. What questions or concerns came to mind as you read that example? Which of the eight steps concerned you or raised the most questions in your mind? Explain your answer.

4. The sample study presented in the chapter was done collaboratively between two researchers. Based on the eight steps in the research process, develop a list of pros and cons for conducting collaborative educational research.

5. Imagine that your school is experiencing problems related to its student dress code. Students are ignoring the code and, in some cases, are becoming extremely disruptive to the educational process as a result. How might you use the process of conducting educational research to investigate alternative solutions to the problem? What specific problems or research questions might you address? What sorts of data would you collect?

SUMMARY

- The main steps in the process of conducting educational research are as follows:
    - Identifying and limiting a research topic or problem
    - Formally stating and refining research questions
    - Reviewing existing literature related to the problem
    - Writing a literature review
    - Developing a research plan
    - Implementing the plan and collecting data
    - Analyzing the collected data
    - Stating findings, conclusions, and recommendations

- Identification of the focus of the study is one of the most critical decisions in the process of conducting educational research.

- The topic should be of personal interest to you and should be manageable.

- Care must be taken in formally stating research questions, as they guide the remainder of the study.

- Reviewing existing literature and writing a literature review can provide a great deal of guidance to a research study.
    - Related literature can inform specification of the problem, development of research questions, and determination of research designs and analyses.

- *How* the research study is actually conducted is known as the research method.
    - Many critical decisions about the research method must be made, including those related to data, participants, instrumentation, timeframe, research ethics, and data analysis.

- Methods used to collect data can be quite diverse.
    - Categories of techniques include observational techniques, interviews, existing data, and data collected through standard educational processes.

- Quantitative data analysis involves statistical techniques and is typically accomplished using statistical analysis software.

- Qualitative data analysis is an inductive process that must be facilitated in the mind of the researcher.

- Analysis of data collected in mixed-methods studies involves both kinds of data analysis and essentially merges the results.

- Findings, conclusions, and recommendations should be stated so they follow logically from all that has preceded in the study.

- The purpose behind stating conclusions and recommendations is to take the answers to the research questions and contextualize them with respect to the broader field of education.

- Extreme caution must be used so that conclusions and recommendations are not stated so globally that they extend beyond the parameters of the study.

- It is important to keep in mind that there is not a single way to research any given topic. Different approaches, methodologies, and data can be used to investigate the same or similar research topics.

KEY TERM

research methods