2   REVIEWING THE LITERATURE

LEARNING OBJECTIVES

Upon completion of this chapter, the reader should be able to

2.1   Investigate a critical issue in the workplace

2.2   Describe the purpose of a literature review by reading through research articles

2.3   Conduct a literature review from start to finish

2.4   Synthesize research when writing a literature review

2.5   Articulate a research problem or question

2.6   Demonstrate knowledge of ethical issues when engaging with literature

2.7   Utilize the *Publication Manual of the American Psychological Association* when synthesizing literature for research

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A DAY AT WORK

When learning doesn't stick!

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Mrs. Burnett is an experienced fourth-grade teacher in a diverse, suburban elementary school who specializes in math and science. As with all educators, she and her colleagues grapple with a range of dilemmas in helping students learn. The fourth-grade teachers on her team all agree that one of the most frustrating challenges is when students say, *"We never learned this!"* or *"I don't really remember."* These are phrases teachers hear regularly; however, forgotten information seems especially problematic in math instruction where each skill builds upon the next. Even when third- and fourth-grade teachers work together to ensure a smooth transition for learners between grade levels, students seem surprised to hear some math topics in fourth grade were previously learned.

For the teachers on Mrs. Burnett's team, students forgetting math concepts and processes seems to occur on a regular basis; from month to month, week to week, or even day to day. Because this is an ongoing concern, Mrs. Burnett and her colleagues often brainstorm ways they can improve this situation. Together, they are constantly trying new strategies, searching for ideas, and discussing possibilities. What can they do to *make learning stick?* Perhaps, there is another way to solve this problem.

INTRODUCTION

Mrs. Burnett has many questions about why students do not retain information from class. She wonders if these questions have been previously examined by researchers. Mrs. Burnett decides to read some journal articles in order to determine if there is research on this topic that can help her identify an effective solution. As educators review the research literature, they will often be able to more clearly define the critical issue. Literature reviews provide the opportunity for educators like Mrs. Burnett to dive deeply into their critical issue and read about what other scholars in the field have explored. By conducting a literature review, Mrs. Burnett and her team can see what has been done, where the gaps in the literature are, and either articulate research questions or identify solutions based on a synthesis of the existing literature. The literature review functions much like a funnel (see Figure 2.1). The educator will first identify a critical issue and how

FIGURE 2.1 ■   The Literature Review

Identifying the Critical Issue
Addressing the Critical Issue

The Purpose of the Literature Review
The Process of the Literature Review
The Product of the Literature Review

Gaining a New Perspective
in the Literature for Practice
or
Identifying a Research
Question

it may be addressed. The educator will then work through the purpose, process, and product of the literature review and, hopefully, will gain a new perspective about the critical issue or relevant research questions.

CRITICAL ISSUES IN THE WORKPLACE

LEARNING OBJECTIVE

2.1 Investigate a critical issue in the workplace.

There are many professionals working in school settings, such as administrators, teachers, school psychologists, school counselors, special education assistants, and social workers. While learning and performance in the classroom often take center stage, these professionals have different roles and areas of focus. Teachers, who tend to have the most contact with students, spend a lot of their time thinking about how best to get students to learn and perform well on class assignments, tests, or projects. Administrators, who are also interested in student learning, would likely focus on "broader" issues, such as overall student performance on standardized state tests or final year-end tests. Other support staff, like school counselors or school psychologists, tend to work individually with students, oftentimes to address personal or social-emotional difficulties.

Regardless of the type of school-based professional, these individuals will all encounter obstacles and challenges in their work. Administrators may struggle with the number of teacher observations they need to conduct, while teachers may get frustrated because their students come to class unprepared or fail to perform well on exams. Now, the purpose of this section is not to speculate about whether educators encounter challenges in their roles but rather to figure out whether such challenges are simply "a normal part of the job" or whether they represent a **critical issue**—that is, an issue that needs to be systematically explored, reviewed, and analyzed in greater depth.

Schools have many mechanisms (e.g., how to support student needs) to deal with noninstructional and instructional problems or situations. When a problem (e.g., student discipline issues) persists after several attempts to solve a problem, educators may think, "Now what? What do we do about it?" These types of issues can be addressed at a departmental level or through collaborations between administrators and faculty. As a first step in generating solutions to important issues, problem-solving teams rely on existing support structures and services within their schools. Beyond such practice, it is again relevant for us to ask, *Is this a daily problem or a critical issue?*

STOP AND THINK 2.1

Principal Jiménez consistently hears concerns from teachers that students are not prepared for class. Is this a "daily problem" or a "critical issue?" Why?

Although a critical issue is difficult to define, in general, it can often be thought of as a type of problem that has strong implications for student learning or teaching, persistently occurs over time despite attempts to correct the problem, or adversely impacts a certain group of individuals. These issues are distinct from daily problems, which tend to be relatively more localized, minor

in intensity, and resolvable using our existing knowledge or available information. A few guiding questions to help distinguish between a critical issue and a daily problem are listed in Table 2.1.

TABLE 2.1 ■ Guiding Questions to Distinguish Between Critical Issues and Daily Problems	
Critical Issue?	**Daily Problem?**
Does the issue seem unresolvable with the information you have available?	Is the problem something that can be resolved in straightforward way?
Does the issue seem to be on a larger scale—for example, include multiple classes, groups of students, across the school or district?	Is the problem more localized and not consistent among similar students, teachers, or situations?
Does the issue have a significant impact on teaching and learning?	Is the problem troublesome (and perhaps annoying or bothersome) but does not significantly interfere with teaching and learning?

Importantly, a broader and problematic critical issue in school-based settings can often emerge from common day-to-day experiences. For example, when a teacher has a nagging feeling that students seem confused about their lesson or they notice many students seem bored by the content, they may be prompted to reflect on the pedagogical changes that can be made to improve understanding and interest. Unfortunately, modifications that educators may make do not always work. It is in these instances when more extensive or intensive changes are needed that one notices the emergence of a critical issue. Other examples of critical issues involve students who have difficulty with reading fluency even after multiple interventions have been put in place, the availability of unbiased procedures for honors-based placement, or the achievement gap for under-represented students. To grapple with these critical issues, educators may need to systematically explore the research literature that addresses these issues.

THE TAKEAWAY

A critical issue is a topic of significance that occurs frequently or with regularity and may warrant further research and exploration.

THE PURPOSE OF A LITERATURE REVIEW

LEARNING OBJECTIVE

2.2   Describe the purpose of a literature review by reading through research articles..

Finding solutions to critical issues in education often requires extending beyond one's personal experiences, discussions with colleagues or other professionals, or utilizing existing school resources. In situations where solutions cannot be readily found, educators may turn to a more systematic, investigative approach to examining a critical issue. From a research perspective, this process is called a **literature review**.

In a sense, the educator who is conducting a literature review is like a detective who is searching for clues, answers, or ideas for cracking the case when there is no obvious solution. The literature review provides the backdrop or explanation to frame the search and ultimately can lead to providing the answer to the critical issue. Figure 2.2 illustrates a general process of using a literature review to address a critical issue and to identify ways to hopefully resolve the critical issue.

FIGURE 2.2   ■   Purposes of Conducting a Literature Review

Purposes of the Literature Review
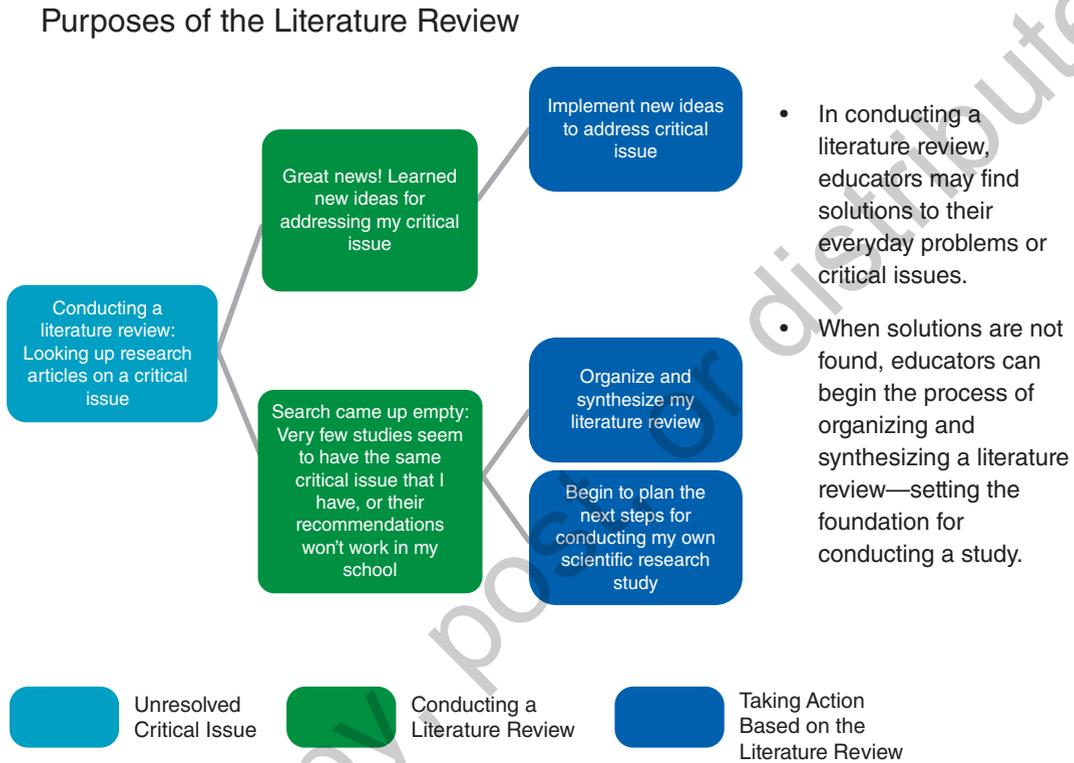
The research literature is important for several reasons. Educators can review selected aspects of the literature to learn about theories or models that underlie student learning and functioning, instructional approaches, and teacher motivation. With this new information, educators can potentially make more effective decisions about promoting positive changes in schools, and identifying new areas for conducting research. In short, conducting a literature review can enable educators and others to (a) become familiar with the theories, findings, methods, and data collection instruments of other researchers; (b) refine and clarify the critical issue or research problem; (c) provide support for current practices; and d) identify new research to address the critical issues of interest.

THE TAKEAWAY

Conducting a literature review is an important first step to tackling a critical issue or solving a research problem. A literature review provides important information on what is already known about a specific area of interest and what future research may need to address.

CONDUCT A LITERATURE REVIEW

LEARNING OBJECTIVE
2.3   Conduct a literature review from start to finish.

We discuss the literature review as a process that leads to a product (Figure 2.3). It is common for educators and researchers to use the term literature review to refer to the steps, procedures, and tactics for identifying relevant and important research about a given topic. However, in this chapter, we distinguish the "how" of conducting a literature review from the "what" that the literature review produces. It is common to hear people talk about a literature review simply in terms of a written summary and formal critique of research-related information about a particular subject area. While this product or written summary is important, it is equally relevant to clarify the many steps or processes needed to produce this final product.

FIGURE 2.3 ■ The Literature Review as a Process and Product

The Literature Review

Process: A set of procedures that helps the educator become familiar with the existing body of knowledge in a topic for a research study

Product: A synthesis of information that helps other educators gain an informed perspective of the current research

In this regard, literature reviews can vary across two broad dimensions: (a) scope (i.e., selective or comprehensive) and (b) structure of the search (i.e., informal or systematic).

In terms of scope, an educator/researcher interested in studying academic performance may choose to focus specifically on group differences (e.g., special education students versus general education students) or on a selective issue, such as paired reading strategies. However, if educators wanted to take a more comprehensive approach, they could search for and evaluate articles on a range of topics, such as socioeconomic status, parental education levels, and reading materials in the home.

The intensity and urgency of the critical issue will often dictate whether the literature review is informal or systematic. Perhaps a school-based professional wants to present information about paired reading strategies to a collaborative team. In this case, a less structured review may be most appropriate. However, if students' reading scores across several grade levels in a school district have been declining for the past couple of years, with subsets of students not meeting proficient levels of understanding, a more systematic and targeted review of the literature could be helpful. In short, when the stakes or standards are higher, one will likely commit to conducting the more systematic review.

Figure 2.4 shows the literature review process as a five-step process that results in a final product or synthesis of information. Regardless of the scope or structure of the literature review, the process to product pathway includes several overlapping and reciprocal procedures: (1) searching, (2) identifying, (3) evaluating, (4) organizing, and (5) synthesizing information. In the following section, we review each of these five steps.

FIGURE 2.4 ■ **The Literature Review Continuum From Process to Product**

Searching | Identifying | Evaluating | Organizing | Synthesizing

Process   Product

Searching for Sources of Research

University libraries, public school libraries, and community libraries offer a range of databases for educators to locate **empirical research**. This is research centered on observations and measurements of a particular event based on the experiences of a researcher. Prior to conducting the search, the interested party should identify key concepts associated with the research problem. This step is necessary because databases operate through keyword searches and often contain a thesaurus to identify the general keywords. Here are a series of steps to follow in conducting a search using keywords:

1. Select and narrow a topic.

2. Identify the key concepts in the research problem. Write a list of key terms.

3. Develop a list of synonyms for key terms. Check the thesaurus to find synonyms.

4. Conduct a database search by starting with the most important key term and sequentially adding additional terms.

5. Narrow or broaden the search as needed. The command "and" between two key terms during a database search narrows the search results; the command "or" broadens the search by telling the search engine that these two key terms are synonyms.

6. Repeat the process as needed.

7. Check the references cited by the articles located to identify other related studies.

8. Create a reference list using the American Psychological Association's (APA) style.

9. Consider if other information would be helpful.

When most people talk about the research literature what likely comes to mind are **peer-reviewed** journal articles produced by researchers whose conclusions and interpretations are reviewed by their peers or colleagues; however, the literature is broader than that. For example, the education literature includes a vast number of publications including books, journal articles, technical reports, papers presented at professional conferences, and curriculum guides, among others based on primary and secondary sources. Given that this broad set of resources can be overwhelming for educators, a key first step is to figure out how to distinguish between primary and secondary sources.

Primary Versus Secondary Sources

Generally speaking, **primary sources** reflect first-hand accounts of a situation or phenomenon, while **secondary sources** analyze and review information provided by the primary sources. While our perspective is that understanding the difference between primary and secondary sources is valuable, . . . you may be asking yourself, "Does the difference even matter? I am just

really looking for a solution to my problem!" We believe the answer is yes! Although both types of sources are important, they do different things.

Primary sources are documents, research studies, images, and artifacts reflecting firsthand information. These sources represent new knowledge, discoveries, personal accounts, or original thinking about a topic. Often times, these sources are typically the first formal appearance of original research. For example, Cleary and Kitsantas (2017) published a study on middle school students' motivation and performance in mathematics. The authors collected data from a large sample of middle school students, analyzed and interpreted the data, and then reported the findings in a published manuscript. The information provided in that article *added* to the current knowledge base about how contextual factors, student motivation, and self-regulated learning relate to mathematics achievement.

In contrast, secondary sources involve analyses, syntheses, and interpretations of primary sources. They are often persuasive as they attempt to describe or explain primary sources in the form of conceptual articles, book chapters, and nonacademic work, such as blogs, newspaper articles, and website information. For example, Schunk and DiBenedetto (2020) wrote an article about motivation in an education journal. Unlike Cleary and Kitsantas (2017), however, Schunk and DiBenedetto did not conduct the studies discussed in the article but rather they provided an overview of the literature that addressed motivational factors in education. Secondary sources can be helpful in integrating data findings from different primary sources. They can also help build a framework of understanding by forming a general picture of research conducted about a particular topic. However, it is also important to be wary of and vet your sources for credibility and accuracy.

Some things to consider as you evaluate research sources include the age of the source (i.e., relevant and current, the author and their background or experiences, the domain extension of the site, which will help you determine who is funding the source (e.g., .org, .com, .gov, etc.); consistent citation of sources; publication sources (e.g., *New York Times, National Geographic*, etc.); and the credibility of the source. Determining whether a publication is a primary or secondary source can sometimes be tricky. While the distinction may be clear in some situations, at other times, it is not so obvious. Thus, educators will often need to dig deeper to figure this out. Table 2.2 presents a few guiding questions and examples to help educators differentiate between primary and secondary sources.

TABLE 2.2 ■ Guiding Questions for Primary and Secondary Sources Related to Education Research		
Ask the Question . . .	**Primary**	**Secondary**
Does the publication describe a current and new study, and were the findings (data and results) collected by the authors?	✓	
Does the publication ONLY present a review of research conducted by other scholars or educators?		✓
Does the publication present a review of research conducted by other scholars or educators but also offer new and novel information based on the review?	✓	
Is an educator presenting a paper at a conference considered a primary or secondary source?	It depends! If the paper is describing research conducted by the educator, it is primary. If the paper synthesizes research conducted by someone else, it would likely be a secondary source.	

An essential goal when searching for research articles is not only ensuring that they are relevant and current but also peer-reviewed. Thus, some common guidelines for accessing articles are to search for peer-reviewed works published within the last 10 years, but seminal work or articles published by prominent researchers in the field are often widely used regardless of the timelapse. *Peer-reviewed* journal articles that are published in a refereed journal are high quality manuscripts determined suitable for publication by experts in the field. When researchers submit an article for publication, they remove their names and identifying information. The article is then distributed to people who are considered experts on the particular topic. These experts are blinded (i.e., unaware) to the author who wrote the article or conducted the study. Typically, two or three experts are asked to review and to convey their recommendations for each article submitted for publication in a journal. This peer-reviewed process is important because it helps to ensure that the only articles that are published have been vetted and reviewed by scholars in the field.

Use of the Planning, Doing, and Reflecting Cycle to Conduct Searches

Now that we know how to effectively search for literature and to discern between primary and secondary sources, and peer-reviewed articles it is time to practice! Following is the *Let's See It!* activity, which is an example of the process involved in locating research for learning strategies used by elementary students to retain knowledge in math.

Let's See It! 2.1

Goal: Connect the Planning, Doing, and Reflecting Cycle of Self-Regulated Learning to Conducting a Literature Search

Mrs. Burnett's observations are leading her to think that working memory issues are affecting students' knowledge retention. Using the backdrop of working memory in mathematics classrooms, Table 2.3 illustrates how the procedures for conducting a literature search correspond with the planning, doing, and reflecting cycle of self-regulated learning. The planning, doing, and reflecting cycle represents the processes of self-regulated learning that you, the learner, can use plan to plan how to complete a literature review assignment, make an attempt to do the assignment with guidance and feedback, and then reflect upon the final product to figure out what worked or what needs to be improved regarding your literature search skills.

TABLE 2.3 ■ Mrs. Burnett Illustrates How She Searches for Sources of Research in Math Knowledge Retention

Searching for Sources of Research	Guiding Procedures	Mrs. Burnett
Planning	1. Select and narrow a topic. 2. Identify the key concepts in the research question. Write a list of key terms. 3. Develop a list of synonyms for key terms. Check the thesaurus to find synonyms.	Mrs. Burnett and her team decide to conduct research on working memory and mathematics retention. Keywords/phrases: "mathematics," "learning strategies," "elementary students," "working memory," "knowledge retention."

Searching for Sources of Research	Guiding Procedures	Mrs. Burnett
Doing	1. Conduct a database search by starting with the most important key term and sequentially adding additional terms. 2. Narrow or broaden the search as needed. The command "and" between two search key terms narrows the search, and the command "or" broadens the search by allowing synonyms. 3. Repeat the process as needed.	Mrs. Burnett, using the preceding key terms, adds one key term at a time to the options in the search bar. She uses other options, including the use of "math" instead of "mathematics" and adds the word "and" to further refine her search: "elementary education" and "mathematics."
Reflecting	1. Check the references cited by the articles located to identify other related studies. 2. Create a reference list using APA format. 3. Consider if other information would be helpful.	Mrs. Burnett reviews the reference list in the articles located on mathematics and memory retention. She decides that comparing articles for regular education and special education students would be helpful. Perhaps the term "differentiation" would assist with the search.

Using our example with Mrs. Burnett and the various guidelines presented in this section, take a moment to practice conducting a literature search using the planning, doing, and reflecting cycle using the following *Let's Do It!* activity.

Let's Do It! 2.1

Guided Practice: Connect the Planning, Doing, and Reflecting Cycle of Self-Regulated Learning to Conducting a Literature Search

You are teaching seventh-grade math for two consecutive years. Your observations are leading you to think that your students' lack of self-efficacy in themselves considerably undermines their capability to succeed in mathematics. You are looking for instructional strategies to increase seventh-grade student self-efficacy beliefs in mathematics. Use key words related to the critical issue (planning) and conduct a quick search using those key words (doing). What did you find? Did you discover additional search terms you originally did not think of (reflecting)? Fill out the Table that follows to help you organize your thoughts, following the example in the *Let's See It!* 2.1.

Searching for Sources of Research	Guiding Procedures	Your Responses
Planning	1. Select and narrow a topic. 2. Identify the key concepts in the research problem. Write a list of key terms. 3. Develop a list of synonyms for key terms. Check the thesaurus to find synonyms.	

Searching for Sources of Research	Guiding Procedures	Your Responses
Doing	1. Conduct a database search by starting with the most important key term and sequentially adding additional terms. 2. Narrow or broaden the search as needed. The command "and" between two search key terms narrows the search, and the command "or" broadens the search by allowing synonyms. 3. Repeat the process as needed.	
Reflecting	1. Check the references cited by the articles located to identify other related studies. 2. Create a reference list using APA format. 3. Consider if other information would be helpful.	

Identifying Sources of Research

After conducting an initial literature search, one would likely have a list of several studies to potentially include in the research synthesis. Oftentimes, there are more articles than necessary to include in a synthesis, but once the articles are reviewed, it is determined that many of them do not actually fit with what the educator/researcher needs. When screening all the articles from the search, there are several things to keep in mind (see Figure 2.5). Each article selected should correspond with the overall problem (i.e., critical issue) emphasized in the literature review. More importantly, articles should reflect the key headings within the literature review. For example, if a research team wants to learn about issues with absenteeism and history achievement, it is

When identifying relevant sources of research for the literature review, researchers should keep in mind the specific context of their critical issue, such as grade level or subject of interest.

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important to include research and then under subheadings, use key terms, such as *absenteeism and history achievement.* Further, if the research team also wanted to consider general education versus special education as part of the review, then they should include some studies related to these topics. As a general benchmark or guidepost as you navigate this process, seek to identify at least two to three key articles per subheading.

Moreover, it is key to not only align the sources with the overall purpose of the literature review, but to also target contemporary and seminal studies that have are considered scientifically valid; that is, they are empirically-based and peer reviewed as part of a reputable journal. In addition, as previously indicated, another guidepost is to select articles published within the last 10 years, unless the writing is from a seminal author. A useful tactic in conducting a literature review is to look up the references in a recently published article that addresses the same critical issue you wish to target. By simply reading the titles of the articles in the reference section, educators may find some additional and helpful articles to consider and locate. Finally, the research questions, methods, and findings should all correspond to the educator's critical issue.

✓	**Checklist for Searching for and Identifying Research Articles**
	1. Does the research study address the critical issue?
	2. Is the research study empirically based on information presented?
	3. Is the research study peer reviewed?
	4. Was the research study conducted within the past 10 years?
	5. Did I check the references of the articles for other potentially relevant studies?

Evaluating Sources of Research

Once the search and screening of the initial set of studies is completed, educators need to do a more thorough, nuanced analysis of these targeted studies. Before getting into specifics about the evaluation process, let's discuss the standard format or structure of a primary source or peer-reviewed article.

Research articles tend to follow a similar sequence of heading and section in a research paper (e.g., abstract, introduction and literature review, method, results, discussion, references). Identifying and understanding this standard format will help educators in their search for articles as well as in the writing of one's own research study. We will delve deeper into each component of a research article next.

Abstract

The abstract is a comprehensive summary of the key sections of the study. It typically includes a brief statement of the topic, a summary of the method used, and the findings. All in all, an abstract includes approximately one or two sentences for each major section of the paper. Abstracts are important because they can help educators get an immediate sense regarding the potential relevance or importance of a study to the target critical issue. It is quite common that after reading the abstract, the educator may realize the study is not addressing the topic of interest and will decide to exclude it from the literature review.

Take a look at the following abstract from a study conducted by Bell and Pape (2012). What information can you gather about the study from reading this portion of the article only?

In this study, we take a sociocultural perspective on teaching and learning to examine how teachers in an urban Algebra 1 classroom constructed opportunities to learn. Drawing on analyses of discourse practices, including videotaped classroom lessons as well as other classroom artifacts and telephone interviews, we describe ways that two teachers and their students interacted to develop mathematical understanding. Through descriptive narrative, we highlight practices that positioned students as competent mathematical thinkers and provided evidence of students' mathematical agency. This study suggests that critical awareness of discourse practices in conjunction with teacher mediation of other affordances for learning within the classroom environment might engage students in mathematical practices such as problem solving, explaining mathematical ideas, arguing for or against specific solutions to problems, and justifying mathematical thinking.

Introduction

The introduction sets the stage for the research study by identifying the problem or critical issue and providing a rationale regarding its overall importance and significance. The authors will often review the theory and background of the key topics and strive to weave together related topics to produce a compelling rationale and a set of research questions. Ideally, the main body of the literature review situates the study within a theoretical framework and presents a logical presentation of information and gaps in the literature that lead to the purpose statement and the research questions of the study.

Method

A method section identifies the participants (sample), research design, procedures used to carry out the study, data sources (dependent variables), instrumentation (where relevant), and a process for analyzing the data. The description of the methods and procedures is the heart of any research study; thus, this section needs to be very clear and explicit, so other educators or researchers can easily replicate the study. Educators will be introduced to the key elements of a methods section in the subsequent chapters.

Results

The results section helps a reader understand the nature of the data that were collected as well as the answers to the research questions listed in the introduction. It typically includes several tables and figures to illustrate the important findings.

Discussion

The discussion provides a thoughtful and analytical discussion of findings of the study and its link to the established literature on the topic. In this section, the authors will address both expected and unexpected findings. Thus, the discussion section is not based solely on the authors' perspectives and opinions. It also references implications for practice, when appropriate, and will discuss the various limitations of the study and future directions of research.

References

In this section, the authors provide a list of primary and secondary sources that were included across all sections of a research article. The majority of citations (i.e., when an author references or cites a source) will appear in the introduction and discussion sections, although some may also be included in the methods. This list in most educational outlets should be presented in APA style.

Now that you have a sense about the key components of research articles, how do you evaluate them to determine their relevance and importance? As mentioned previously, when

you are searching and reading through articles, you may decide to eliminate some that are not closely linked to the critical issue. Further, conducting research is analogous to being a detective; you need to pay attention to certain clues or details that convey information about the quality and relevance of the articles to your critical issue or student population. For example, in searching for articles on working memory and mathematics, you may find an article that initially seems relevant. However, when reading the article, you discover that it actually focuses on helping engineers resolve spatial memory problems that arise in building construction.

Hopefully, for any literature review that is conducted, educators will find plenty of articles that are closely tied to the critical issue. These articles should be put aside and used as part of the formal literature review (to be discussed in a subsequent section). But please keep the following point in mind as you embark on this journey: Conducting a thorough literature review is a necessary but time-consuming process. As educators, we strive to make a positive impact on those we teach and work with. Conducting an effective literature review is critical for helping us improve teaching and learning and or for stimulating ideas about needed educational research.

STOP AND THINK 2.2

If you were to conduct a literature review on a critical issue, what sort of articles would you search for?

Organizing Sources of Research

The next key step in the literature review process is to organize the details and key features of the targeted studies. This step in the process is akin to teachers encouraging their students to keep binders with separation tabs to categorize different aspects of their coursework—homework, classwork, quizzes, projects, and so forth. Similarly, teachers often turn to *Google Drive* or other similar platforms to create folders for a similar purpose. These organizational strategies are useful to students because it is easy for students to get overwhelmed with information or mixed up. The same logic applies to educators sifting through the literature on a given topic—they can also become overwhelmed.

In organizing research studies and information prior to synthesizing and writing the literature review, we encourage educators to use a table or annotated bibliography (see Table 2.4). This type of visual display is often helpful for examining each individual study and for identifying trends or themes across them. Grouping your studies according to themes or main ideas will help you see how your sources relate to each other. Table 2.4 incorporates the key aspects of research articles previously displayed according to related themes.

TABLE 2.4 ■ Example Matrix of How to Organize Your Articles								
	Full Citation	Purpose/ Research Questions	Definition of Terms	Research Method	Sample	Data Collection Instruments	Analysis	Key Findings
Theme A								
Theme B								

The last step in conducting a literature review is to synthesize what you have discovered; thus the next section will tackle the synthesis step in more detail.

SYNTHESIZE RESEARCH

LEARNING OBJECTIVE
2.4   Synthesize research when writing a literature review.

Much like a detective who has completed their investigation, we are now ready to analyze and synthesize the targeted studies into a meaningful narrative—that is, to report an accurate and compelling story about what was found in our review. However, this story is not one that can be formed in one sitting. As shown in Figure 2.5 and as we have frequently mentioned, the literature review is both a process and a product. To make this easier to follow, we conceptually break down this journey into two phases: the **pre-synthesis phase** and the **synthesis phase**.

The pre-synthesis phase steps entail the following:

1. Communicating the problem clearly

2. Summarizing key research studies (one or two short paragraphs) and emphasizing how each article relates to the critical issue

The synthesis phase elaborates on the following:

3. Comparing and contrasting studies that address the critical issue

4. Developing a rationale, if appropriate, when interested in conducting a new study

FIGURE 2.5 ■ The Shifting Process to Product Literature Review
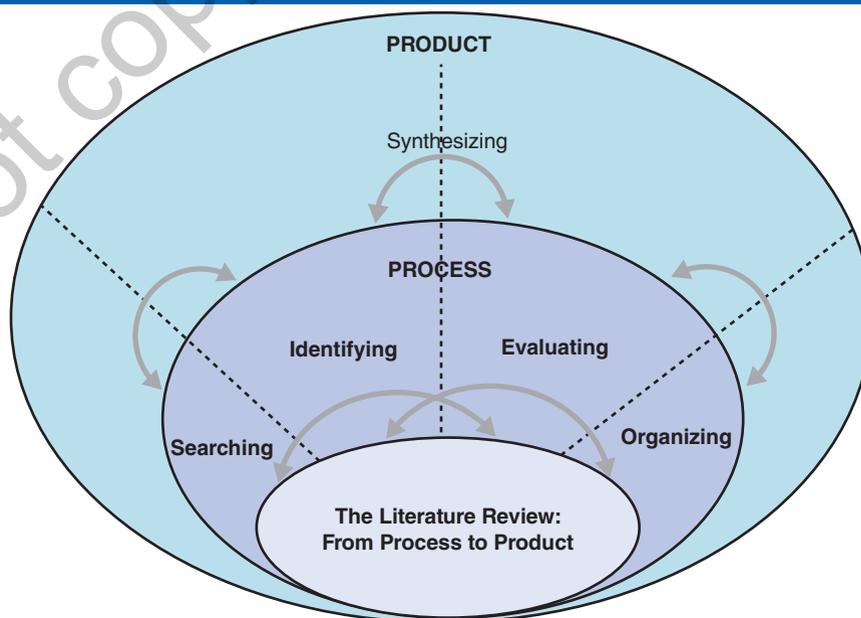
By analyzing the literature review journey in two phases (i.e., pre-synthesis and synthesis) encompassing the four steps, you have all of the information to lay out the blueprints for the story you want to tell. Now, this story crafted by a researcher will not only summarize findings from the research articles, but will also integrate and weave the articles together to relate them back to the original critical issue or problem identified at the beginning of the journey Later in this chapter we will walk you through the journey of crafting your own story.

The Pre-synthesis Phase: Communicating the Critical Issue and Summarizing Key Studies

In the first four steps of the literature review process, you have already done the research and prepared summaries (your annotated bibliographies). Now, you need to take this information and craft the story you want to tell. The pre-synthesis phase represents the activities authors use to organize their thinking about how to write their summary most effectively—making sure they communicate and summarize the key studies that relate to their critical issue. An important feature to include early in the outline involves the conceptual definitions of key terms. A **conceptual definition** is a dictionary-like definition that helps one clearly communicate the essence or nuances of the key terms or variables in a study. These definitions help the educator to state more clearly what is meant and can be taken from all reference works, including journals, books, and other sources. Table 2.5 lays out the steps for the planning involved in the pre-synthesis phase.

TABLE 2.5 ■ The Planning of the Pre-synthesis Phase—Summary of Steps	
Step 1.	**Review and Select**
	Review the summaries you prepared on the articles you thought were directly relevant to your critical issue and select the ones that seem the *most* relevant; be sure to include seminal articles.
Step 2.	**Organize and Order**
	Think about the flow of your story and organize your articles in the order you want to "tell" or write about using that order. Articles are typically described in a story in chronological order, but you must also keep in mind other information such as sample characteristics, themes, and methodologies that are related to your critical issue.
Step 3.	**Outline Your Story**
	Statement of the problem: Add a few bullets highlighting the significance of the critical issue and why it is an issue that needs further research.
	Key terms: Use your key terms to identify and prepare an outline of subtopics based on the articles you have selected—these will be your *headings or subheadings* (themes you want to emphasize).
	Gaps in the literature: Add a few bullets on where research is needed.
	Rationale: Write a few sentences or bullets about why your proposed research study is important in light of the critical issue.
	Research questions/hypotheses: Draft two to three research questions or hypotheses. While we provide guidance on how to write a research question in the following section, during this phase, you can begin to generate questions that remain after your research on the critical issue.

Overall, as you outline the story it is important to read other literature reviews to get a sense of the types of themes you might want to cover or ways to organize this section of the paper. Take advantage of your reference list if you find a well-conducted literature review. The reference section of similar sources might help to identify studies to emulate. The following checklist provides a review of elements to consider when conducting a e pre-synthesis of the literature.

✓	**Checklist for Literature Review Pre-Synthesis**
	1. Review and select
	2. Organize and order

	3. Outline your story
	    a. Statement of the problem
	    b. Key terms subheadings
	    c. Gaps in the research
	    d. Rationale
	    e. Research question/hypothesis

The Synthesis Phase: Analysis and Developing a Rationale

The synthesis phase involves compiling all components from the pre-synthesis phase into a narrative story. The researcher will begin by comparing and contrasting all the studies that were gathered, followed by an analysis of how exactly empirical research studies fit together to develop a rationale related to the critical issue. Using the outline of your topic, pull together all the research you have gathered as part of your "investigation" and then start thinking about how you can weave these research sources all together to create a narrative. Look for patterns, similarities, and differences between studies and between group of studies that will help you identify gaps or areas for further research.

In Table 2.6 we provide an overview of the key steps in this synthesis process.

TABLE 2.6 ■ The Doing of the Synthesis Phase—Summary of Steps	
Step 1.	**Stay Focused, Read, and Emulate**
	Use the outline to begin writing but stay focused on your critical issue. The key is to weave the critical issue into each of the sections you are writing. In your introduction, describe and emphasize the importance of the critical issue and the need for research in this area. By now you should be familiar with reading the introductions to research studies. Use one that you particularly like as a "model" of how you would like to write.
Step 2.	**Compare and Contrast**
	As you describe the studies using your annotated bibliographies, compare and contrast the strengths and weaknesses of these studies. Be sure to keep your subheading themes in mind and always stay focused on your critical issue.
Step 3.	**Emphasize Gaps**
	Do not hesitate to indicate gaps in the research. Think of yourself as the detective who discovered some clues but not everything to solve the case—this means further research is needed. Weave these weaknesses in as you write about the research findings. This helps with the development of your research questions and strengthens your rationale for conducting research.
Step 4.	**Writing Tips**
	Use the reference list summaries to integrate in the writing. Whether the writing is a summary or quotes, be sure to include a citation. Excessive use of quotes should be minimized in the synthesis. Use primary sources to synthesize information and secondary sources to further support ideas and as transitions.
	Report the findings of authors in past tense as concisely as possible.
	Double check that the articles you cite are documented and formatted appropriately. in APA.

The doing of the synthesis phase is in essence the integration of existing knowledge. The next phase, the reflecting of the synthesis phase will help you reflect on the synthesis product and make revisions as needed. Write, revise, and rewrite to ensure accuracy of content and formatting. I might be also beneficial to have another pair of eyes to read and critique your synthesis. In Table 2.7 we provide a list of the "should" and "should nots" of the literature synthesis product.

TABLE 2.7 ■ The Reflecting of the Synthesis Phase: The "Should" and "Should Nots" of the Literature Synthesis Product		
	"Should"	**"Should Not"**
Step 1	• Adequately cover previous research on the topic • Cite findings directly from original studies (primary) • Cover seminal (classic or often-cited) research • Be organized hierarchically and logically by topic • Discuss "major" studies in detail and "minor" studies more broadly • Establish a theoretical framework for the research problem • Make an argument or compelling rationale for the significance of the research	• Only reflect an educator's own research • Reflect others' "opinions" about previous research • Focus primarily on outdated materials of research • Be organized by author-related studies • Reflect studies that are unrelated to the research problem or methods of the study • Be a simple summary or list of studies • Use anecdotal evidence as the primary part of the rationale
Step 2	• Go slowly; write, revise, rewrite, revise . . . • Keep your eyes on the goal and continuously monitor your progress • Ask another colleague to provide feedback	• Rush or be sloppy and leave important information out • Underestimate a writing assignment as typically takes more time than expected • Avoid seeking help

We now provide a checklist on some key questions to consider when developing a literature review synthesis. Using this checklist, take a look critically at your synthesis product and reflect on the steps you took to complete this task, focusing on adjustments and revisions needed to improve the final product.

✓	Checklist for Literature Review Synthesis
	1. Did I identify and adequately review the two or three essential ideas or areas related to my overall critical issue?
	2. Are my headings appropriate and logically sequenced and presented?
	3. Did I include a relevant theory or model that links the various studies?

(*Continued*)

✓	Checklist for Literature Review Synthesis
	4. Did I present and discuss the key or seminal studies that support my overall rationale?
	5. Did I present a compelling, logical case or "story" regarding why my research questions and proposed study are important?

At first glance, it could seem as if you are writing a report or summary of the articles, but a literature review is much more than that. While a report may be written to provide an overview of a topic or persuade readers to understand an argument, the overall goal of the literature review extends further. In this sense, the literature review frames current understandings of a topic to inform research questions, synthesize information across studies, and highlight gaps in the literature. It is helpful to remember that the literature review is an iterative process, and it takes much time to finalize a fully developed product. The purpose is to determine what has been done and what still needs to be done.

The story generated from the literature review will either help educators

- resolve the critical issue of interest, or

- identify questions that need to be answered—that is, to conduct a research study!

STOP AND THINK 2.3

Over the course of his academic career, Martin has written many book reports. Is a literature review synonymous with "book report"? Why or why not?

FORMULATE RESEARCH PROBLEMS OR QUESTIONS

LEARNING OBJECTIVE

2.5   Articulate a research problem or question.

At this point in the chapter, you have learned about the steps educators can take to better understand, refine, and synthesize the literature around critical issues. You also learned how school-based problems can often serve as stimulating factors for conducting comprehensive and systematic literature review. A literature review represents both a process of uncovering what research has to say about the critical issue as well as how one might best analyze and synthesize that research. Ideally, doing the investigative work of a literature review will help educators or other professionals do one of two things:

- Find solutions or deeper understanding of the critical issue—this is akin to the "Aha!" moment educators arrive at when realizing how to help their students or improve instruction.

- Develop questions that need to be examined in a research study—think of this process as a jigsaw puzzle where all the pieces fit nicely but there are a few pieces missing. What does one need to make the puzzle more complete?

Research questions are directly linked to the target critical issue but typically go beyond this issue or capture it in investigative or measurable terms. Research questions developed for new research studies shine the light on unresolved problems or questions that have not been previously studied in the literature. In the next section, we describe in more detail how to develop effective and clear research questions

Parts of the Research Question

Well-stated research questions can do one or more of the following: (1) describe characteristics, trends, or processes in a specific context, (2) identify and compare groups based on specific characteristics, and/or (3) relate variables or factors under investigation. For example, a research question may specifically examine how frequently middle school students use self-regulatory strategies while solving math problems in class. An educator interested in a comparison research question might also want to examine whether males and females differ in their use of self-regulatory strategies. Or one might want to examine relationships between use of self-regulatory strategies and mathematics achievement. Regardless, combinations of these factors, while aligning with the critical issue and purpose of the study, can open up the opportunity for quality research questions that can be addressed by researchers in the field, respectively.

Strategies for Writing Good Research Questions

Writing a good research question is not easy. It is a revision-oriented process that takes time, reflection, and refinement. Albert Einstein emphasized strong questioning techniques and curiosity as the impetus for discovery. In fact, Einstein's theory of relativity developed from his initial question, *"What if I rode a beam of light across the universe?" So how does an educator know when and how to write a research question?* Some questions or critical issues that might arise in school are not necessarily questions that can be answered even after completing a thorough literature review.

Developing effective research questions includes whether or not the critical issue is measurable and whether it will contribute to our understanding and educational practice. Specifically, five general factors should be considered when thinking about research questions: (a) feasibility, (b) measurability, (c) clarity, (d), significance, and (e) ethicality.

Feasibility

For *feasibility*, an educator may have a topic of interest; however, collecting data may not be possible because of resources like time, money, personnel, and equipment. For example, districts may limit when research takes place because of testing windows, so it might not be possible to answer a question for an issue that only occurs in the spring.

Measurability

Measurability reflects the extent to which the key variables or construct can be clearly and effectively assigned values or meaning. An example of a research question not able to be answered or measured is one based on subjective value judgements lacking concrete measurable variables—such as "Is Mr. Jones or Mrs. Smith a better math teacher?" This research question is vague and subjective and does not offer a construct that can be measured. A better research question in this situation might be "Does Mr. Jones exhibit more effective forms of student questions and feedback than Mrs. Smith?" You may hypothesize that the time of day the classes are taught or the level of enjoyment students feel while in the class—two measurable constructs—might have something to do with the answer to this research question.
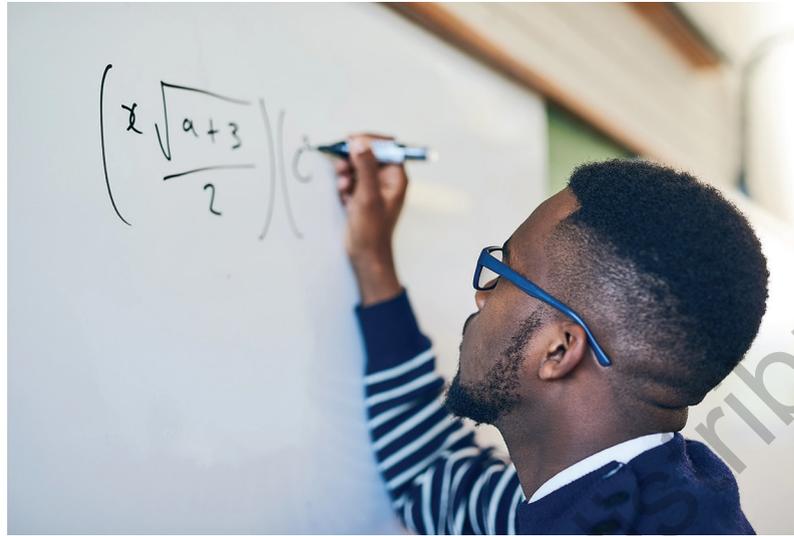
A research question formulated to assess teacher mathematical knowledge should be readily measurable.

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Clarity

Clarity relates to whether the research question accounts for conceptual and **operational definitions** of key terms. As mentioned previously, a conceptual definition provides the meaning of a construct and often relates to a theoretical basis, whereas the operational definition delineates how a variable will be identified, measured, or assessed by providing a clear, concise, detailed definition of a measure. Vague conceptual and operational definitions create poorly defined research questions.

Another aspect of clarity that is really important is making sure that your research question aligns with your critical issue and your purpose for the study. For example, it would not make sense to have a research question on family dynamics if your critical issue is students having trouble retaining what was learned during lessons, with the purpose for your study being to explore different pedagogical approaches to presenting the curricula. Although family dynamics and how the students' caregivers view learning could impact student retention, a research question of this nature would not align well given differing characteristics (e.g., key words used during literature search, different set of participants, different context/setting for the study).

Significance

As a researcher, a key question to ask is whether the research question is worth exploring. That is, does the answer to a research question provide an additional contribution to address the given critical issue? When addressing the issue of *significance*, keep in mind two reflective notions:

- Why would it be important to answer this question practically or theoretically?

- How might answers to this question contribute to the field?

Designing questions that are not significant and will not improve practice or conditions for students may not be useful.

Ethicality

One of the most important things to consider when writing a research question is *ethics.* In other words, the intent of the study should not cause or should seek to minimize physical or psychological harm to the participants. For instance, asking some students about their educational experiences during a major climate event, such as a hurricane, might stir up traumatic memories. Research conducted through universities and public school systems are reviewed by an institutional review board (IRB) to ensure the study is ethical.

THE TAKEAWAY

A good research question is well defined, feasible, measurable, significant in terms of its contribution to existing literature, and ethical to answer.

Reflecting the Methodology Within the Question

There are many different types and formats of research questions. In quantitative research designs, research questions will often emphasize the nature of relationships or effects among variables, whereas qualitative research designs utilize questions that focus more on the nature, aspects, or characteristics of processes, issues, and events. Table 2.8 shows examples of quantitative and qualitative research questions.

TABLE 2.8 ■ Examples of Quantitative and Qualitative Research Questions
Example
Describe characteristics, trends, or processes in a specific context.
What are elementary teachers' perceptions of their experiences in using manipulatives in the math classroom?
Compare groups based on specific characteristics.
What is the impact of math manipulative instruction on English language learners (ELL) as compared to their typical peers?
Relate variables.
What is the relationship between math achievement and student math self-efficacy in a math manipulatives intervention?

After a research question has been formulated, the educator will need to decide what research design will be used to test the research question. Thus, the first consideration is whether the question relates to the methodology or broad approach of the study (e.g., quantitative or qualitative). For instance, in a quantitative study, the emphasis will be on examining trends or relationships among variables (e.g., achievement, interest, socioeconomic status). On the other hand, qualitative studies aim to capture the meaning of processes and events, focusing on the "why and how," often from the perspectives or lived experiences of participants. Qualitative questions are framed very differently from quantitative questions because

questions relate closely to the research goals and methods as part of the research framework. Consider the following scenario to frame quantitative and qualitative questions: An elementary school has a growing population of gifted and talented children. Presently, these students are immersed in classrooms with little or no individual support except for a 1-hr-a-day class of advanced instruction. To supplement enrichment programs, these students were invited to an after-school STEM camp. A team of elementary school educators were interested in understanding the day-to-day school experiences of these students as well as the impact of the after-school STEM camp based on student STEM interest and problem-solving skills. Like many issues or situations that educators face, this scenario can be investigated from a quantitative or qualitative research perspective.

Quantitative and qualitative research questions may be used separately or in tandem to gain a more in-depth understanding of a critical issue, such as evaluating the impact of an after-school STEM camp on student learning.

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An example of a quantitative question related to this scenario could be "Does participation in the after-school STEM camp impact gifted and talented elementary students' STEM interest and problem-solving skills?" This question is more quantitative in nature because it is examining effects on specific variables, interest in STEM, and problem-solving skills. On the other hand, to gauge the perspective of student experiences in their daily activities in comparison to the STEM camp, an appropriate qualitative question might be "What are the perspectives and attitudes of gifted and talented elementary students on the experiences of a STEM camp?" While both questions require data collection, the quantitative question underscores the use of measures (i.e., STEM interest scale) to determine changes for the students receiving the program. On the other hand, the qualitative research question reflects the need to do a deeper analysis or investigation of students' thoughts and feelings (i.e., perspectives) about the after-school program. The quantitative question relies on numbers and statistical analyses, whereas the qualitative question will likely be answered through analyses of interview transcripts or other forms of qualitative data. The quantitative–qualitative distinction is addressed thoroughly in Chapter 3. Table 2.9 provides some guidance to question starters for both styles of questions.

TABLE 2.9 ■ Quick Sentence Starters for Quantitative and Qualitative Research Questions	
Quantitative	**Qualitative**
"Is there a relationship . . ."	"What is the perspective . . ."
"Are there differences . . ."	"What are . . ."

In this section, we use the *Let's See It!* and *Let's Do It!* activities to help you learn how to write qualitative and quantitative research questions. For further practice, please complete the "*You Do It!*" activity.

Let's See It! 2.2

Goal: Identify Research Questions That Meet the Conditions of Feasibility, Measurability Clarity, Significance, and Ethicality

Having reviewed the literature and refined her research study, Mrs. Burnett is interested in finding out if the use of math manipulatives improves working memory and math achievement for elementary students. She has decided to look at both quantitative and qualitative data and will write questions for each. Following are the questions she writes, which also meet the conditions of feasibility, measurability, clarity, significance, and ethicality. What do you think?

Quantitative Question

Are there differences in fourth-grade students working memory and math achievement following use of manipulatives in a math classroom?

Qualitative Question

What are the experiences of fourth-grade students regarding use of math manipulatives in the recall of math concepts?

Using our scenario as an example, when looking at Mrs. Burnett's quantitative research question, we see they are based in the measure of achievement, which will require an analysis of numbers and statistics that can be answered with a yes or a no. Mrs. Burnett's qualitative question on the other hand requires a deeper understanding of the students' perspectives (i.e., thoughts and feelings) and will most likely consist of data in the form of words from interviews or observations. Now, based on the preceding example, try writing your own research questions using the "*Let's do it!*" activity.

Let's Do It! 2.2

Guided Practice: Learn How to Write Quality Research Questions

Recall that quantitative questions focus on relationships among variables or trends and differences between groups, whereas qualitative questions describe perceptions, processes, and meanings. Use the following purpose statements to write one quantitative and one qualitative research question for each scenario. Then check the answer key at the end of the chapter for possible options.

Practice 1: The purpose of this study is to examine the impact of an anti-bullying program on tenth-grade student achievement.
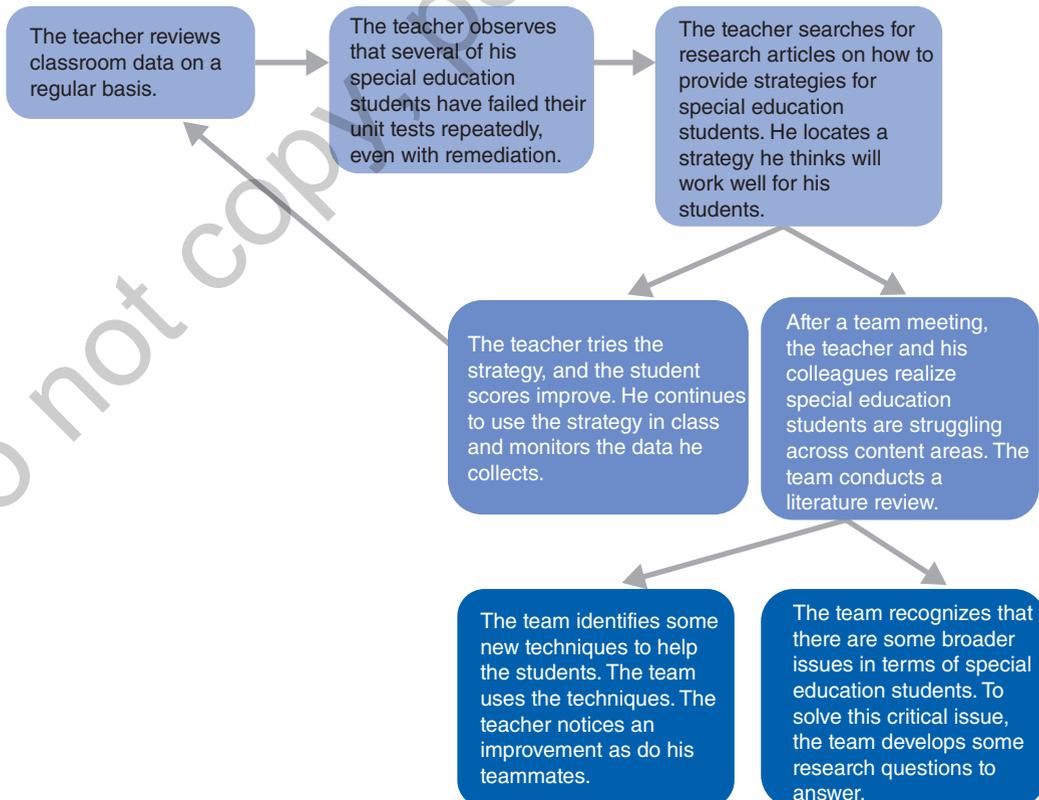
Research Question

Practice 2: The purpose of this study is to examine the effect of a reading intervention on student reading performance.

Research Question

Articulating Research Questions With Data

Educators can attempt to address critical issues by first engaging in a literature review and then by generating specific research questions. For example, teachers in the classroom collect data on their students throughout the year like unit test scores. These data can raise a red flag about a problem in the school or classroom and can be used to assist teachers in defining a critical issue that involves investigating as shown in Figure 2.6. This process might involve generating research questions related to these initial data.

FIGURE 2.6   ■   Classroom Data as the Impetus for a Literature Review and Research Questions

The teacher reviews classroom data on a regular basis.

The teacher observes that several of his special education students have failed their unit tests repeatedly, even with remediation.

The teacher searches for research articles on how to provide strategies for special education students. He locates a strategy he thinks will work well for his students.

The teacher tries the strategy, and the student scores improve. He continues to use the strategy in class and monitors the data he collects.

After a team meeting, the teacher and his colleagues realize special education students are struggling across content areas. The team conducts a literature review.

The team identifies some new techniques to help the students. The team uses the techniques. The teacher notices an improvement as do his teammates.

The team recognizes that there are some broader issues in terms of special education students. To solve this critical issue, the team develops some research questions to answer.

Most classroom teachers naturally become concerned or anxious when they review their gradebook and realize some students are struggling. But this type of classroom data are important because they can spur the teacher to take action on a critical issue and ultimately frame research questions to find a solution based on what they find after conducting a literature review.

Within the daily school responsibilities of educators, administrators often request that data are collected for students so teams within the school can meet, assess student progress, and make plans to shift instruction. Examples of possible data sources would be unit tests and benchmarks. In addition, administrators often request that teachers collect other information, such as attendance, intervention strategies (e.g., one-on-one instruction, paired reading, preferential seating), and socioeconomic status (SES), as some examples. Table 2.10 is a sample classroom dataset with two variables (SES, memory retention) and four-unit tests.

TABLE 2.10 ■ Mrs. Burnett's Mathematics Gradebook						
Student ID Number	SES	Memory Retention Issue	Test 1	Test 2	Test 3	Test 4
01543	1	1	75	70	76	80
23678	1	0	88	90	83	100
14222	2	1	58	60	55	70
12874	2	0	47	50	45	56
23691	1	1	60	57	49	62
82905	2	0	90	94	94	98
10032	1	0	87	88	95	96
17431	1	1	35	39	37	50
58237	2	0	95	93	90	95
37920	2	1	55	49	60	48
61888	1	0	86	93	94	92
43267	2	0	77	83	71	74
82913	2	0	93	90	91	94
44357	2	0	88	85	90	94
76548	1	1	10	35	40	30

Note. SES (1 = Low; 2 = High); memory retention (0 = no; 1 = yes)

The dataset in Table 2.10 could be used in multiple ways. Data analysis of such a secondary dataset can identify a potential critical issue, can serve as the impetus to begin conducting a literature review, and can also help educators to think about important questions to ask if one were to conduct a research study.

STOP AND THINK 2.4

What trends do you notice?
What questions might you ask Mrs. Burnett about the test scores?
What more do you want to know about these students?

Now, here is an opportunity to use the *Let's See It!* and the *Let's Do It!* activities to help you further learn how to write research questions with data.

Let's See It! 2.3

Goal: Understand How to Write Research Questions With Data and Situations in Which More Data May Need to Be Collected to Answer the Research Questions

Even before conducting a formal literature review, Mrs. Burnett can use the dataset presented in Table 2.10 to articulate tentative research questions, such as the following:

Research Question 1: Are there differences in test performance based on memory retention issues?

Research Question 2: To what extent do test scores differ based on SES?

However, classroom datasets are not always useful to answer all potentially relevant questions. For example, Mrs. Burnett could not answer the question, "Are there differences in test performance for at-risk students as compared to their peers?" because she does not have an at-risk variable in her dataset. She also could not address, "What are student perceptions of math manipulatives in the classroom?" because this is a qualitative research question, and the data would come from methods such as interviews. These unanswered questions, which are related to Mrs. Burnett's original critical issue, can be addressed in one of two ways that were emphasized in this chapter:

1. Conduct a systematic literature review to identify a solution.
2. Propose and conduct a new research study.

Let's Do It! 2.3

Guided Practice: Practice Writing Research Questions With Data

Now, let's practice writing research questions using a sample set of data included in Table 2.11. This dataset includes data from a research study designed to assess whether a "learning how to learn" intervention implemented in a rural and an urban school improved students' standardized scores in mathematics before and after the intervention. Review the data and write two research questions that could be answered with this dataset. Then write two questions that could not be answered with the dataset. Check your answers in the answer key at the end of the chapter.

Two Research Questions That Could Be Answered

Research Question 1

Research Question 2

Two Research Questions That Cannot Be Answered

Research Question 1

Research Question 2

TABLE 2.11 ■ Example Dataset			
Student ID Number	**Location of School**	**Math Standardized Score Before the Intervention**	**Math Standardized Score After the Intervention**
12345	Urban	390	400
24567	Rural	330	350
34578	Urban	464	358
43456	Rural	436	451
57894	Rural	476	416
64567	Urban	425	432
74567	Rural	492	479
84564	Urban	421	380
95673	Urban	353	401
10345	Rural	464	396
11345	Urban	307	474
12444	Rural	491	439
23345	Urban	503	421
94678	Urban	436	435
23549	Rural	337	416
16234	Urban	449	493
57567	Rural	404	430
18456	Urban	400	420
19456	Rural	480	496
20456	Urban	418	450

ETHICAL CONSIDERATIONS

<table>
<tr><td colspan="2" align="center">**LEARNING OBJECTIVE**</td></tr>
<tr><td>**2.6**</td><td>Demonstrate knowledge of ethical issues when engaging with literature.</td></tr>
</table>

Ethics should always be at the forefront of all decision making when engaging in research. You might think that research ethics should be considered when you are carrying out a study while engaging in collecting or analyzing data for your study. However, there are many ethical dilemmas specific to the literature review process that a researcher should consider before they even begin working on the study, including (a) maintaining an unbiased approach, (b) avoiding plagiarism, and (c) proposing ethical research questions.

Maintaining an Unbiased Approach

Educators and researchers should recognize their own values and biases in relation to the issues in the topic being identified. It is important to maintain objectivity as much as possible when evaluating research and to be aware of personal needs, interests, and belief systems in relation to your study and topic of interest. For example, a researcher studying high school dropout rates assumes the rates are higher in urban areas as opposed to rural areas. This bias could steer article selection and summaries. The research may focus only on factors that attribute to dropout rates in urban areas, disregard factors that impact students in other areas, and inaccurately make claims that extend to students in suburban and rural areas. It is the responsibility of the researcher to determine whether a topic can be ethically studied and ensure objectivity while planning and designing a study. In summary, as you gather published research, you will need to remain objective and examine all sources with a critical eye.

Avoiding Plagiarism

Having an understanding of intellectual property or the ownership of knowledge matters in the literature review process. Plagiarism is considered a type of copyright infringement that protects an author's work from being used without their permission. Thus, when you use someone else's ideas or material, you will need to acknowledge it. Some strategies in avoiding plagiarism are to (a) use quotation marks when copying something verbatim from an article; (b) learn how to paraphrase; and (c) correctly cite and reference sources. It is also possible to plagiarize yourself; thus, you should always paraphrase rather than directly copy your text from a previously published work.

Proposing Ethical Research Questions

As we discussed earlier, one of the most quintessential aspects of ethics to remember is to carefully reflect as you are making evaluations and judgments about research findings and consider research questions that are ethical. Scholars of peer-reviewed articles selected for the literature review have followed IRB requirements prior to conducting research. Some key questions to consider when writing ethical research questions include the following: (a) How will I recruit my participants? (b) How will I ensure the safety of my participants? (c) How will I ensure confidentiality and anonymity of my participants? These questions might help you determine if you are asking an ethical research question. It is the responsibility of the researcher to ensure that all participants have equal opportunities to be selected to participate in a study and have

access to and can benefit from programs, procedures, or other services. If a researcher choses to study an after-school math program, all eligible students in the school would need to have an equal chance of being selected for the research study. This action ensures that no one is denied access to a beneficial program without a fair system of selection in place. It is also the responsibility of the researcher to ensure the well-being of all participants by conducting research that does not cause harm and maximizes the possible benefits for the participants. Finally, as drafting a research question, it is important to consider the ethical issue of maintaining anonymity for participants. Participants are willing to share sensitive aspects of their lives, and so in return, they should be guaranteed privacy to their identities in order to potentially avoid discrimination or harassment. This concern applies to school-based professionals as well as researchers.

THE TAKEAWAY

Educators should be aware of all potential sources of personal biases to ensure that their review of the literature is conducted in a professional and competent manner.

AMERICAN PSYCHOLOGICAL ASSOCIATION STYLE

LEARNING OBJECTIVE

2.7   Utilize the *Publication Manual of the American Psychological Association* when synthesizing literature for research.

Have you ever had to complete an assignment but felt that your professor was not providing you with adequate guidelines? This can be a very frustrating experience, especially if your professor grades for style, formatting, citations, and references. One of the benefits of writing scientific research is that there is a manual that provides detailed information and examples on how to write an effective literature review. The American Psychological Association (APA) provides a manual for publications and is the standard guide used in the scientific community.

Since 1929, the **Publication Manual of the American Psychological Association** has sought to set standards for the communication of scientific information. These standards, commonly known as "APA style," are the most frequently used manuscript standards in the social sciences. What is APA style? APA style is a format for academic documents such as scholarly journal articles and books. APA style mostly deals with in-text citations, references, headings, and tables and figures.

However, APA is more than a format; it is a system for synthesizing research—and covers everything you need to prepare and write your literature review. Whether you are writing a synthesis paper for a class or you are working on an empirical study for publication, you will need to use APA style to organize your manuscript and list the references you used. If you have never used this format before, you may find it is quite a bit different from some of the other writing styles, which may be somewhat challenging. However, learning how to write an APA manuscript is a useful skill that will serve you well.

Each chapter of this book will highlight a different component of a publication using APA style. You can also refer to the *APA Publication Manual* (7th ed.) for help. For this chapter, we will focus on APA citations in-text, references, headings, and tables and figures.

In-Text Citations

From what we have discussed so far, the literature review is based on research and scholarly work rather than personal opinion. For this reason, educators will use the scholarly publications identified from the literature review process to write the literature review product. When using these publications, researchers must cite them in the body of the text (e.g., within a paragraph). Here are a few guidelines for citing sources in-text:

1. When writing in-text citations, include the author(s) last name and publication year (e.g., Hiller & Kitsantas, 2016).

2. For three or more authors, write only the first author's last name followed by "et al." (e.g., Kitsantas et al., 2011).

3. If an author was mentioned in a paragraph, followed by a date in parentheses, the date does not need to be repeated in parentheses within the same paragraph unless the author and date are both in parentheses (e.g., Hiller and Kitsantas [2016]) versus (Hiller & Kitsantas, 2016)].

4. For government documents without an author, list the name of the government agency.

5. For website articles, list the name of the website if there is no author.

These are just a few guidelines. For the exhaustive list of guidelines, check out the seventh edition of the APA manual.

References

We mentioned earlier that educators can look at references at the end of articles to find additional sources of information on the critical issue. You must also provide this information to readers of your literature review; therefore, anyone you cite must have an accompanying reference at the end of a document. Referencing differs depending on whether the source is a journal article, book, chapter in a book, and so forth. This is the part that most educators find challenging because there are several subtle requirements on alphabetizing, capitalization, punctuation, and listing how to find the article on the internet. When creating your reference section, follow these guidelines:

1. Alphabetize references.

2. Review the APA manual to cite publications based on the type (e.g., journal articles, books, chapters in edited books, reports, etc.).

3. Include URL addresses for websites.

4. Include digital object identifiers (DOIs) for journal articles when possible. DOI numbers can be located on the front of publications or at crossref.org.

5. Some websites (like https://www.easybib.com/) will create reference lists; however, it is a good idea to check the references in comparison to the APA manual.

Headings

Headings are very helpful in cueing readers as to the organization of the literature review. APA format uses a specific *level of headings* depending on the placement in text. See Table 2.12 as an example of the different level headings based on an outline of working memory and math retention.

TABLE 2.12 ■ Model of APA (7th ed.) Heading Levels		
Heading Levels	**APA Format**	**Example**
Level 1	Centered, Bold, Title Case Heading	Student Working Memory and Math Retention in Elementary School
Level 2	Flush Left, Bold, Title Case Heading	Difficulties with Working Memory
Level 3	*Flush Left, Bold, Italic, Title Case Heading*	*Compounding Difficulties with Working Memory*
Level 4	Indented, Bold, Title Case Heading, Ending with a Period.	Special Education Students.
Level 5	Indented, Bold, Italic, Title Case Heading, Ending with a Period.	*Special Education Students Who Are English Language Learners.*

Tables and Figures

Throughout writing, authors often include tables and figures, and so it is highly recommended to follow APA style in terms of formatting these graphics. For both tables and figures, list **Table X** and **Figure X** in bold above the image. Then list the title in italics with the first letter of each word capitalized. For tables, include a total of three solid, horizontal lines, and include an appropriate table note (if needed) underneath the third horizontal line. Please see the examples of an APA table and figure in Figures 2.7 and 2.8, respectively.

FIGURE 2.7 ■ Model of APA (7th ed.) Table

APA style for table heading

Table 1

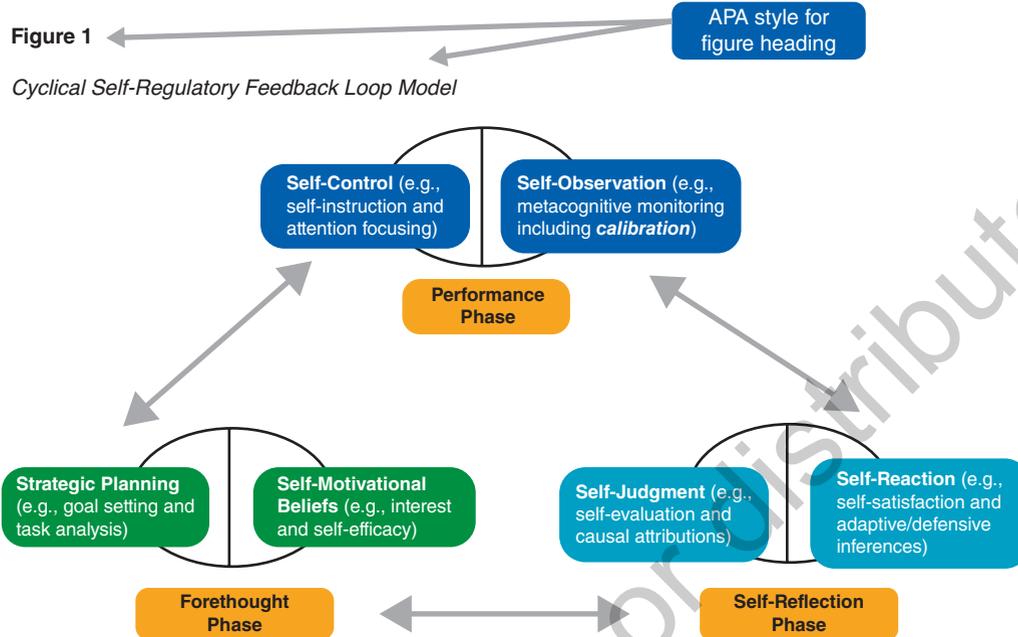*Pearson Correlations among Perceived Resposibility for Learning and Sources of Self-Efficacy in Mathematics*

	1	2	3	4	5	6
1. Perceived responsibility	–					
2. Sources of self-efficacy	.11*	–				
3. Mastery experience	.12*	.69**	–			
4. Vicarious experience	.10*	.73**	.61**	–		
5. Social persuasions	.12*	.77**	.66**	.72**	–	
6. Physiological states	.14**	.66**	.54**	.69**	.71**	–

Three solid, horizontal lines

Note. $*p < .05$; $**p < .01$

Table note

FIGURE 2.8   ■   Model of APA (7th ed.) Figure

Figure 1

APA style for figure heading

Cyclical Self-Regulatory Feedback Loop Model

Self-Control (e.g., self-instruction and attention focusing)

Self-Observation (e.g., metacognitive monitoring including *calibration*)

Performance Phase

Strategic Planning (e.g., goal setting and task analysis)

Self-Motivational Beliefs (e.g., interest and self-efficacy)

Self-Judgment (e.g., self-evaluation and causal attributions)

Self-Reaction (e.g., self-satisfaction and adaptive/defensive inferences)

Forethought Phase

Self-Reflection Phase

In closing, whether you are writing a synthesis paper for a class or you are working on an empirical study for publication, you will need to use APA format to organize your manuscripts and list the references you used. Learning how to write a manuscript in APA is a useful skill that will serve you well in the future. Please complete the *You Do It!* exercise in the extension activities as you review a paper that you are working on and pay particular attention to the headings, in-text citations, tables, figures, and references.

CHAPTER SUMMARY

Chapter 2 provided an overview of how an educator can investigate a critical issue by conducting a review of the literature, transition through the process of a literature review, synthesize information to create a literature review product, and determine whether or not further research is required to answer a critical issue. Assuming that a literature review does not yield an answer or solution to the problem then, an educator can articulate their own research questions and conduct a study. As an inherent part of the research process, we also provided guidance on ethical considerations and APA style. The following sections provide supplemental activities for enrichment and guidance.

EXTENSION ACTIVITIES

YOU DO IT! 2.1

Practice Writing Research Questions With Data

Self-Directed Practice: Practice Writing Research Questions

Please use the attached dataset to develop two to three research questions. In addition, identify two to three questions that cannot be answered with the dataset.

You Do It! 2.2

Practice Using APA Style

Self-Directed Practice: Practice Checking for Errors in APA Style

Use a paper that you are working on and check for APA errors.

KEY TERMS

Publication Manual of the American
    Psychological Association
Conceptual definition
Critical issue
Empirical research
Literature reviews
Operational definition

Peer-reviewed
Pre-synthesis phase
Primary sources
Secondary sources
Seminal work or author
Synthesis phase

ANSWER KEY

Stop and Think Activities

STOP AND THINK 2.1

It depends on the nature and extent of the problem. Not having a pencil each day may not be a critical issue. Educators are likely not going to want to do a full-fledged investigation into the causes of why students do not have pencils. However, if certain groups of students do not have internet access at home to complete work or if something more pervasive appears to be influencing the problem, this could point to a critical issue and be a sign that a more systematic investigative approach is necessary to remedy the problem.

STOP AND THINK 2.2

After identifying a critical issue of interest, the researcher should search for articles that are closely related to the critical issue and that are peer reviewed and/or empirical in nature. As a general guideline, researchers should look for research that is current and published in the last approximately 10 years. However, it may also be important to include seminal works or authors depending on the nature of the critical issue.

STOP AND THINK 2.3

A literature review and a book report are not the same thing. A literature review is more than a report or summary of the articles. The goal of a literature review is to frame current understandings of a critical issue to inform research questions, synthesize information from various studies, and identify gaps in the current literature, while a book report primarily seeks to provide an overview of a topic. The literature review is an iterative process.

STOP AND THINK 2.4

In general, Test 1 scores were the lowest, with most students improving their performance by Test 4. Students who have a memory retention issue appear to score significantly lower across all four tests than students who do not. One might ask Mrs. Burnett to explain more about this memory retention issue and how that might influence performance on math tests given that math is largely an applied subject. One may also want to know if any of these students are exceptional learners and how that may impact their academic performance and/or predisposition to memory retention issues.

Let's Do It! Activities

LET'S DO IT! 2.1

Guided Practice: Connect the Planning, Doing, and Reflecting Cycle of Self-Regulated Learning to Conducting a Literature Search

Searching for Sources of Research	Guiding Procedures	Your Responses
Planning	1. Select and narrow a topic. 2. Identify the key concepts in the research problem. Write a list of key terms. 3. Develop a list of synonyms for key terms. Check the thesaurus to find synonyms.	**Key Concepts/Terms** • Mathematics • Academic achievement • Mathematics self-efficacy • Self-efficacy interventions • Middle school **Potential Synonyms** • Mathematics education • School learning • Academic self-esteem • School-based intervention • Secondary school
Doing	4. Conduct a database search by starting with the most important key term and sequentially adding additional terms. 5. Narrow or broaden the search as needed. The command "and" between two search key terms narrows the search, and the command "or" broadens the search by allowing synonyms. 6. Repeat the process as needed.	**Potential Articles** Chen, P. P. (2003). Exploring the accuracy and predictability of the self-efficacy beliefs of seventh-grade mathematics students. *Learning and Individual Differences, 14*(1), 77–90. https://doi.org/10.1016/j.lindif.2003.08.003 Kitsantas, A., Cheema, J., & Ware, H. W. (2011). Mathematics achievement: The role of homework and self-efficacy beliefs. *Journal of Advanced Academics, 22*(2), 310–339. https://doi.org/10.1177/1932202X1102200206 Pajares, F., & Graham, L. (1999). Self-efficacy, motivation constructs, and mathematics performance of entering middle school students. *Contemporary Educational Psychology, 24*(2), 124–139. https://doi.org/10.1006/ceps.1998.0991
Reflecting	7. Check the references cited by the articles located to identify other related studies. 8. Create a reference list using APA format. 9. Consider if other information would be helpful.	Usher, E. L. (2009). Sources of middle school students' self-efficacy in mathematics: A qualitative investigation of student, teacher, and parent perspectives. *American Educational Research Journal, 46*(1), 275–314. https://doi.org/10.3102/0002831208324517 There are numerous potential answers to this question. An example could be looking at socioeconomic status.

Let's Do It! 2.2

Learn How to Write Quality Research Questions

Practice 1: The purpose of this study is to examine the impact of an anti-bullying program on tenth-grade student achievement as well as differences between males and females.

Quantitative: To what extent does the anti-bullying program decrease reported bullying behaviors and increase tenth-grade student achievement? Does this effect differ based on location of school?

Qualitative: What are the perspectives of tenth-grade students on the anti-bullying program?

Practice 2: The purpose of this study is to examine the effect of a reading intervention on student reading performance.

Quantitative: Does participation in the reading intervention have an impact on fourth-grade students' reading comprehension?

Qualitative: What are fourth-grade students' perceptions about the reading intervention?

Let's Do It! 2.3

Practice Writing Research Questions With Data

Two Research Questions That Could Be Answered

1. Are there any differences in students' math standardized scores before and following the intervention?

2. Do students' math scores vary based on location of the school?

Two Research Questions That Cannot Be Answered

1. In what ways did students in the intervention group find the "learn how to learn" intervention to be helpful in supporting their overall academic achievement?

2. Is there a relationship between math standardized scores and math course grades for these students?