Thinking Skills and Research Methods -2

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What is research? Research is a process in which you engage in a small set of logical steps. In this chapter, we define research, discuss why it is important, advance six steps for conducting research, and identify how you can conduct research ethically by employing skills that you already have. You can approach research in two ways—through a quantitative study or a qualitative study—depending on the type of problem you need to research. Your choice of one of these approaches will shape the procedures you use in each of the six steps of research. In this chapter, we explore the many ways these two approaches are similar and different.

A DEFINITION OF RESEARCH AND ITS IMPORTANCE

Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue. At a general level, research consists of three steps:

1. Pose a question.
2. Collect data to answer the question.
3. Present an answer to the question.

This should be a familiar process. You engage in solving problems every day and you start with a question, collect some information, and then form an answer. Although there are a few more steps in research than these three, this is the overall framework for research. When you examine a published study, or conduct your own study, you will find these three parts as the core elements.

Not all educators have an understanding and appreciation of research. For some, research may seem like something that is important only for faculty members in colleges and universities. Although it is true that college and university faculty members value and conduct research, personnel in other educational settings also read and use research, such as school psychologists, principals, school board members, adult educators, college administrators, and graduate students. Research is important for three reasons.

Research Adds to Our Knowledge

Educators strive for continual improvement. This requires addressing problems or issues and searching for potential solutions. **Adding to knowledge** means that educators undertake research to contribute to existing information about issues. We are all aware of pressing educational issues being debated today, such as the integration of AIDS education into the school curriculum.

Research plays a vital role in addressing these issues. Through research we develop results that help to answer questions, and as we accumulate these results, we gain a deeper understanding of the problems. In this way, researchers are much like bricklayers who build a wall brick by brick, continually adding to the wall and, in the process, creating a stronger structure.

How can research specifically add to the knowledge base and existing literature? A research report might provide a study that has not been conducted and thereby fill a void in existing knowledge. It can also provide additional results to confirm or disconfirm results of prior studies. It can help add to the literature about practices that work or advance better practices that educators might try in their educational setting. It can provide information about people and places that have not been previously studied.

Research Improves Practice

Research is also important because it *suggests improvements* for practice. Armed with research results, teachers and other educators become more effective professionals. This effectiveness translates into better learning for kids. For instance, through research, personnel involved in teacher education programs in schools of education know much more about training teachers today than they did 20 years ago.

Several Problems with Research Today

Despite the importance of research, we need to realistically evaluate its contributions.

- Culture
- Funds
- Good understanding
- Value and contribution
- Resources
- Practical limitations for experimental researches

THE SIX STEPS IN THE PROCESS OF RESEARCH

When researchers conduct a study, they proceed through a distinct set of steps. Years ago these steps were identified as the "scientific method" of inquiry (Kerlinger, 1972; Leedy & Ormrod, 2001). Using a "scientific method," researchers:

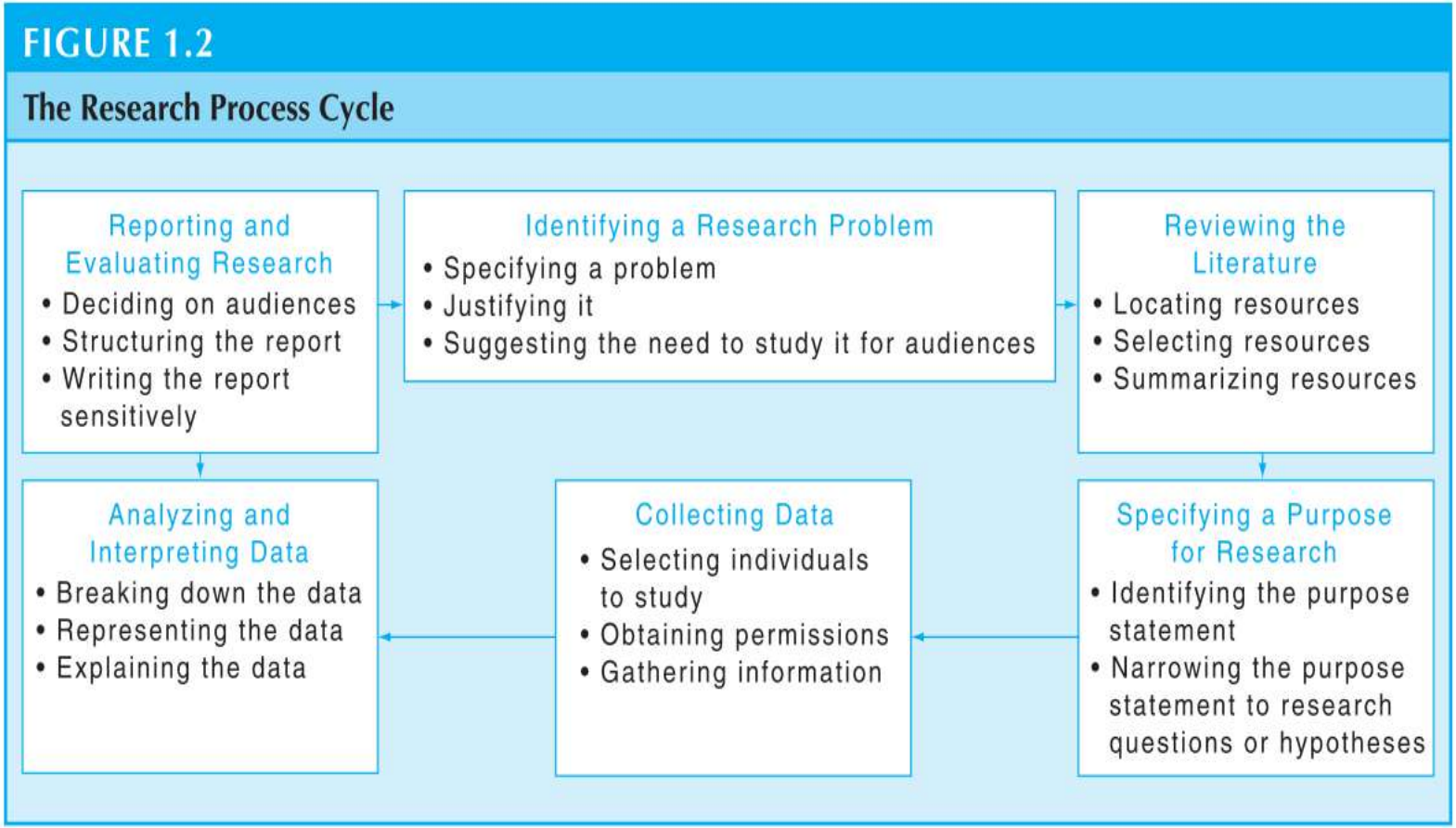
- Identify a problem that defines the goal of research
- Make a prediction that, if confirmed, resolves the problem
- Gather data relevant to this prediction
- Analyze and interpret the data to see if it supports the prediction and resolves the question that initiated the research

Applied today, these steps provide the foundation for educational research. Although not all studies include predictions, you engage in these steps whenever you undertake a research study. As shown in Figure 1.2, the **process of research** consists of six steps:

1. Identifying a research problem
2. Reviewing the literature
3. Specifying a purpose for research
4. Collecting data
5. Analyzing and interpreting the data
6. Reporting and evaluating research

FIGURE 1.2

The Research Process Cycle



Identifying a Research Problem

You begin a research study by identifying a topic to study—typically an issue or problem in education that needs to be resolved. **Identifying a research problem** consists of specifying an issue to study, developing a justification for studying it, and suggesting the importance of the study for select audiences that will read the report. By specifying a "problem," you limit the subject matter and focus attention on a specific aspect of study.

Reviewing the Literature

It is important to know who has studied the research problem you plan to examine. You may fear that you will initiate and conduct a study that merely replicates prior research.

However, faculty and advisors often fear that you will plan a study that does not build on existing knowledge and does not add to the accumulation of findings on a topic. Because of these concerns, reviewing the literature is an important step in the research process. **Reviewing the literature** means locating summaries, books, journals, and indexed publications on a topic; selectively choosing which literature to include in your review; and then summarizing the literature in a written report.

The skills required for reviewing the literature develop over time and with practice. You can learn how to locate journal articles and books in an academic library, access computerized databases, choose and evaluate the quality of research on your topic, and summarize it in a review. Library resources can be overwhelming, so having a strategy for searching the literature and writing the review is important. Let's examine Maria's approach to reviewing the literature.

Specifying a Purpose for Research

If your research problem covers a broad topic of concern, you need to focus it so that you can study it. A focused restatement of the problem is the *purpose statement*. This statement conveys the overall objective or intent of your research. As such, it is the most important statement in your research study. It introduces the entire study, signals the procedures you will use to collect data, and indicates the types of results you hope to find.

The **purpose for research** consists of identifying the major intent or objective for a study and narrowing it into specific research questions or hypotheses. The purpose statement contains the major focus of the study, the participants in the study, and the location or site of the inquiry. This purpose statement is then narrowed to research questions or predictions that you plan to answer in your research study. Let's check again with Maria to see how she will write a purpose statement and research questions.

Collecting Data

Evidence helps provide answers to your research questions and hypotheses. To get these answers, you engage in the step of collecting or gathering data. **Collecting data** means identifying and selecting individuals for a study, obtaining their permission to study them, and gathering information by asking people questions or observing their behaviors. Of paramount concern in this process is the need to obtain accurate data from individuals and places. This step will produce a collection of numbers (test scores, frequency of behaviors) or words (responses, opinions, quotes). Once you identify these individuals and places, you write *method* or *procedure sections* into your research studies. These sections offer detailed, technical discussions about the mechanics and administration of data collection. Many decisions, however, go into creating a good data collection procedure. Let's see how Maria will address data collection.

Analyzing and Interpreting the Data

During or immediately after data collection, you need to make sense of the information supplied by individuals in the study. Analysis consists of "taking the data apart" to determine individual responses and then "putting it together" to summarize it. **Analyzing and interpreting the data** involves drawing conclusions about it; representing it in tables, figures, and pictures to summarize it; and explaining the conclusions in words to provide answers to your research questions. You report analysis and interpretation in sections of a research report usually titled *Results*, *Findings*, or *Discussions*. How will Maria analyze and interpret the data in her research?

Reporting and Evaluating Research

After conducting your research, you will develop a written report and distribute it to select audiences (such as fellow teachers, administrators, parents, students) that can use your information. **Reporting research** involves deciding on audiences, structuring the report in a format acceptable to these audiences, and then writing the report in a manner that is sensitive to all readers. The audiences for research will vary from academic researchers who contribute and read journal articles, to faculty advisors and committees that review master's theses and dissertations, to personnel in educational agencies and school districts who look for reports of research on timely topics. Your structure for the research report will vary for each audience, from a formal format for theses and dissertations to a more informal document for in-house school reports. In all types of reports, however, researchers need to be respectful and to avoid language that discriminates on the basis of gender, sexual orientation, race, or ethnic group.

The audience for your report will have its own standards for judging the quality and utility of the research. **Evaluating research** involves assessing the quality of a study using standards advanced by individuals in education. Unfortunately, there are no iron-clad standards for evaluating educational research in the academic research community; in school districts; or in local, state, or federal agencies. Still, we need some means of determining the quality of studies, especially published research or reports presented to practitioner audiences. Let's look at how Maria thinks about organizing her research report.

THE CHARACTERISTICS OF QUANTITATIVE AND QUALITATIVE RESEARCH IN EACH OF THE SIX STEPS

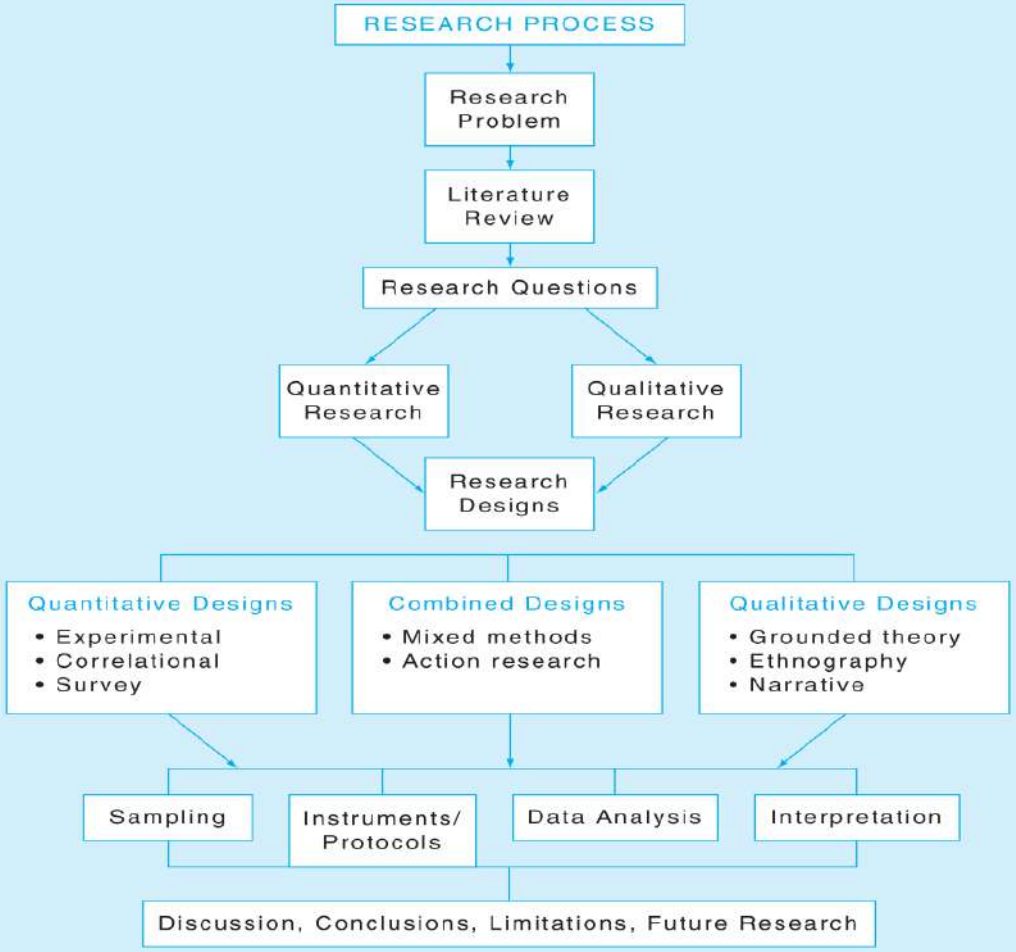
Conducting educational research is more than engaging in the major steps in the process of research. It also includes designing and writing the research in one of the two major tracks: quantitative research or qualitative research. The way that this unfolds is illustrated in the flow of the research process as shown in Figure 1.3.

Based on the nature of the research problem and the questions that will be asked to address the problem (and accompanying review of the literature that establishes the importance of the problem), the researcher chooses either the quantitative or qualitative research track. The problem, the questions, and the literature reviews help to steer the researcher toward either the quantitative or qualitative track. These, in turn, inform the specific research design to be used and the procedures involved in them, such as sampling, data collection instruments or protocols, the procedures, the data analysis, and the final interpretation of results.

What are the characteristics of quantitative and qualitative research tracks at each step in this research process? As each characteristic is discussed, it is helpful to first examine two sample journal articles at the end of this chapter because these articles will be cited with illustrations for each characteristic. Marginal notes have been inserted into the articles to identify the specific passage containing the quantitative and qualitative

FIGURE 1.3

Flow of the Research Process through Quantitative and Qualitative Research



Quantitative Research Characteristics

In quantitative research the major characteristics are:

- Describing a research problem through a description of trends or a need for an explanation of the relationship among variables
- Providing a major role for the literature through suggesting the research questions to be asked and justifying the research problem and creating a need for the direction (purpose statement and research questions or hypotheses) of the study
- Creating purpose statements, research questions, and hypotheses that are specific, narrow, measurable, and observable
- Collecting numeric data from a large number of people using instruments with preset questions and responses
- Analyzing trends, comparing groups, or relating variables using statistical analysis, and interpreting results by comparing them with prior predictions and past research
- Writing the research report using standard, fixed structures and evaluation criteria, and taking an objective, unbiased approach

In quantitative research, the investigator identifies a research problem based on trends in the field or on the need to explain why something occurs.

For example, you might seek to learn how voters describe their attitudes toward a bond issue. Results from this study can inform how a large population views an issue and the diversity of these views. However, some quantitative research problems require that you explain how one variable affects another. Variables are an attribute

In reviewing the literature in quantitative research, you will typically see a substantial literature review at the beginning of the study. Thus, the literature plays a major role in two ways: justifying the need for the research problem and suggesting potential purposes and research questions for the study.

In quantitative research questions, you ask specific, narrow questions to obtain measurable & observable data on variables. The major statements and questions of direction in a study the purpose statement, the research questions, and the hypotheses are specific and narrow because you identify only a few variables to study.

In quantitative data collection, you use an instrument to measure the variables in the study. An instrument is a tool for measuring, observing, or documenting quantitative data. It contains specific questions and response possibilities that you establish or develop in advance of the study.

In quantitative data analysis, you analyze the data using mathematical procedures, called statistics. In reporting and evaluating quantitative research, the overall format for a study follows a predictable pattern: introduction, review of the literature, methods, results, & discussion.

In quantitative research, you also use procedures to ensure that your own personal biases and values do not influence the results.

Qualitative Research Characteristics

In qualitative research, we see different major characteristics at each stage of the research process:

- Exploring a problem and developing a detailed understanding of a central phenomenon
- Having the literature review play a minor role but justify the problem
- Stating the purpose and research questions in a general and broad way so as to the participants' experiences
- Collecting data based on words from a small number of individuals so that the participants' views are obtained
- Analyzing the data for description and themes using text analysis and interpreting the larger meaning of the findings
- Writing the report using flexible, emerging structures and evaluative criteria, and including the researchers' subjective reflexivity and bias

Qualitative research is best suited to address a research problem in which you do not know the variables and need to explore. The literature might yield little information about the phenomenon of study, and you need to learn more from participants through exploration.

A central phenomenon is the key concept, idea, or process studied in qualitative research.

In qualitative research, the literature review plays a less substantial role at the beginning of the study than in quantitative research. In qualitative research, although you may review the literature to justify the need to study the research problem, the literature does not provide major direction for the research questions.

In qualitative research, the purpose statement and the research questions are stated so that you can best learn from participants. You research a single phenomenon of interest and state this phenomenon in a purpose statement.

In qualitative research, you collect data to learn from the participants in the study and develop forms, called protocols, for recording data as the study proceeds. These forms pose general questions so that the participants can provide answers to the questions. Often questions on these forms will change and emerge during data collection.

In qualitative research typically you gather a text database, so the data analysis of text consists of dividing it into groups of sentences, called text segments, and determining the meaning of each group of sentences.

In reporting qualitative research you employ a wide range of formats to report your studies. Although the overall general form follows the standard steps in the process of research, the sequence of these "parts" of research tends to vary from one qualitative report to another.