

## CHAPTER

# 6

# Designing a Research Project

### Preview

This chapter examines seven tasks to which you must give attention when planning your own research project:

- State topic, problem, and questions and/or hypotheses
- Outline the library search for related information
- Identify needed data and their probable sources
- List steps to be carried out in the study
- Specify procedures and tools for collecting data
- Foresee how data can best be analyzed and interpreted
- Anticipate the appropriate report format for your research

### Targeted Learnings

This chapter is designed to help you plan a research project of your own. As you complete the chapter exercises, you will simultaneously be preparing a preliminary plan for researching a topic of your choice. Furthermore, you will see how investigations are planned in any of the standard types of educational research. As you proceed through the chapter, make sure to look for information related to the following concerns:

1. Stating a topic and problem, with appurtenant questions and/or hypotheses
2. Identifying the type of research called for in your topic
3. Learning more about the type of research you have selected
4. Organizing a library search for information related to your topic
5. Foreseeing needed data and their potential sources
6. Making a list of steps to be taken in conducting the study
7. Noting the procedures and tools you will require for collecting data
8. Anticipating the kinds of analyses your data will need
9. Drawing up conclusions from your data analysis
10. Selecting the appropriate format for reporting your research



## How Planning Should Be Done

Authorities offer various suggestions as to how research should be planned. Gay, Mills, and Airasian (2006), for example, say that a research plan should give attention to these elements:

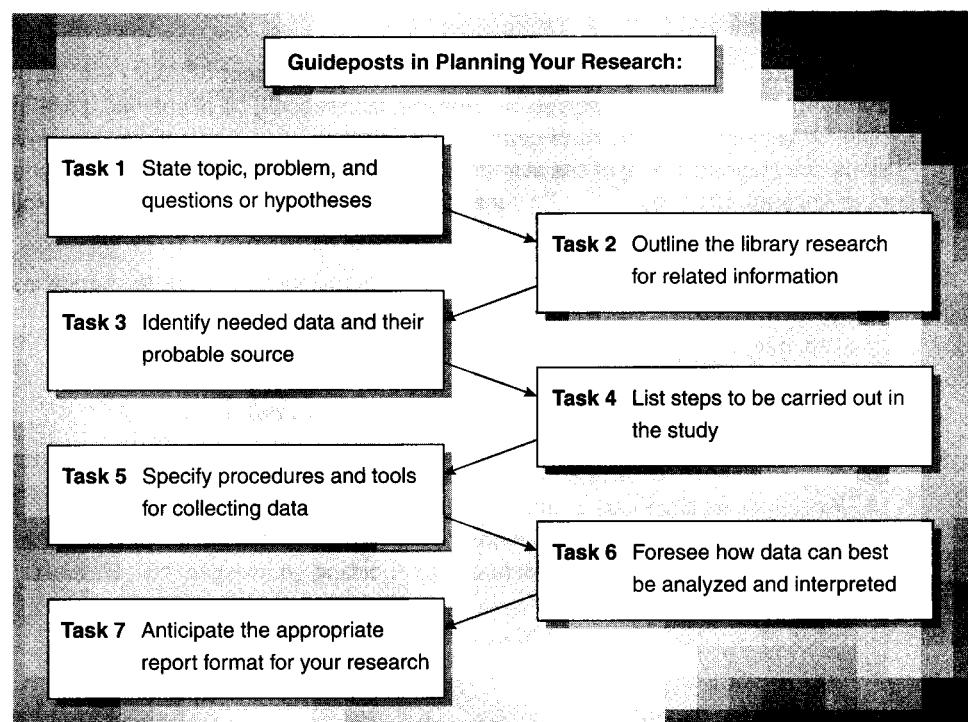
1. Introduction, including statement of the problem, review of the literature, and statement of the hypothesis
2. Method, specifying participants, instruments, materials/apparatus, design of the study, and procedure
3. Data analysis
4. Time schedule
5. Budget

Wiersma and Jurs (2005) emphasizes that planning should be done in accordance with whether the research is qualitative or quantitative. For *qualitative research*, he suggests the following:

1. A working design that specifies participants and possible variables
2. A working hypothesis
3. Procedures of data collection such as interview, observation, and document perusal
4. Procedures of data analysis and interpretation, including data reduction, data organization, and description

For *quantitative research*, Wiersma and Jurs maintain that “explaining or controlling variance is an important part of quantitative research” (2005, p. 84). He suggests, therefore, that when planning quantitative research, one should describe not only the participants, hypotheses, and plans for collecting and interpreting data but also the procedures by which variance will be controlled, such as through the following:

1. Randomization, which tends to spread a variable evenly across groups being studied



- 2. Holding factors (e.g., ethnicity of participants) constant, thus reducing the effect that an irrelevant factor might have on the dependent variable
- 3. Making adjustments statistically, to remove the effects of an intervening variable such as intelligence

Wiersma and Jurs (2005, p. 85) clarify these points using an example of a study on the effects of different teaching methods on learning high school chemistry, from which Table 6.1 is adapted.



## The Approach to Planning Advocated in This Book

The planning advice we have just seen is excellent, but experience shows that those new to research appreciate as much guidance as they can get. For that reason, abundant instructions and exercises are provided in this chapter to increase your ability to plan an investigation of your own. In addition to the material presented in this chapter, you will be asked to read at least one of the other chapters presented later—one that goes into detail about the type of research you wish to plan.

We will now proceed to the tasks you must accomplish when planning your own research. You will be guided through those tasks in order. Instructions are presented for planning each task, and exercises are provided to strengthen your understanding. By completion of all the exercises, you will have simultaneously prepared a plan you can follow in researching the topic you have selected.



## Tasks to Be Accomplished When Planning Research

Seven major tasks must be completed as you design a workable plan of research. These elements comprise your **research design**.

- 1. State the title, topic, problem, and questions and/or hypotheses.
- 2. Identify keywords or descriptors and outline the library search for related information.
- 3. Identify data you will need and their probable sources.
- 4. List the steps you will need to carry out in order to complete the study.
- 5. Specify the procedures and tools you will employ in collecting data.
- 6. Foresee how data can best be analyzed and interpreted.
- 7. Anticipate the report format most appropriate for your research.

We will now proceed through these tasks and their related exercises.

**Table 6.1**

| Variable                   | Control of Variable  |
|----------------------------|--|
| Student science background | Random assignments of students to groups                             |
| Teacher                    | An independent variable; each teacher uses different methods         |
| School                     | A constant; students of only one school are included                 |
| Ability level              | Statistically controlled, by partialling out effects of intelligence |

## Task 1. State the Title, Topic, Problem, and Questions and/or Hypotheses

To begin your research plan, specify the topic, the problem, and the research questions and/or hypotheses. For the topic, you should

1. Select an educational matter that is of personal interest or concern to you.
2. Determine whether the topic is researchable, considering ethics, complexity, and time.
3. Compose a tentative working title for your research.

### Exercise 6.1

Identify and jot down a topic (e.g., “student self-concept and reading achievement” or “home laboratories for biology students”) that you have a genuine interest in exploring. Compose a tentative working title that describes the topic.

Example:

Topic: student self-concept and reading achievement

Working Title: The relationship between self-concept and reading achievement among fifth-grade students

Your Topic:

Working Title:

Now move to Exercise 6.2 and decide whether the topic can be researched from a practical standpoint, taking into account ethical considerations, amenability to scientific method, difficulty, time, and cost. If you believe it can be successfully researched, then proceed. If you find it questionable, go back and revise your initial research topic or select a different one.

For stating the problem you should

1. State the purpose of your intended research.
2. Explain why the topic is of sufficient importance to merit investigative attention.

### Exercise 6.2

Appraise your topic to determine whether it can be researched by a graduate student in education, considering

- Ethics—Can the project be done ethically, or does it have questionable aspects?
- Scientific method—Can the topic be investigated scientifically?
- Difficulty—Does the project seem too easy, too difficult, or about right?
- Time—Does it seem that the project can be investigated in the time you have available?
- Cost—Is the investigation likely to entail undue expense?

3. Specify the *limitations* (existing constraints) and *delimitations* (limits you will impose) under which your investigation will be conducted, together with the assumptions you are making, but cannot prove.
4. Define the terms central to your investigation, especially those that have unusual meanings.

Having selected your topic and given it a working title, you next describe the purpose of the study clearly and briefly. Simply state what you want to investigate, discover, or accomplish. This brief description is called the *statement of the problem*. In case you do not remember how to compose a statement of the problem, here are three examples to use as models:

- The purpose of this study is to determine whether age of entry into kindergarten has an effect on students' subsequent school learning and behavior.
- The purpose of this study is to construct and test an English vocabulary program. The program will be designed for use in third-grade classrooms and will be field-tested in five selected classes in Elmwood schools.
- The purpose of this study is to explore factors related to achievement levels in English and mathematics among high school students of Filipino, Hispanic, and Caucasian descent.

### Exercise 6.3

State the purpose of the proposed investigation for the topic you identified in Exercise 6.1.

Purpose: \_\_\_\_\_

Along with the statement of the problem, you will be expected to indicate why the study is worth pursuing. This portion is referred to as the *importance* of the study.

### Exercise 6.4

Write a one-paragraph justification of the importance of the study you have identified.

Limitations and delimitations of the study to be undertaken should be specified at this point. Because these concerns are not always immediately clear, you may not be able to state them precisely at this stage of planning—it may be necessary to revisit them later in the development of your study.

In the *limitations of the study* you identify existing restrictions that are outside your control, such as availability of records, problems in selecting a sample, or time allotments. Some common examples of research limitations include the lack of a complete population list from which to select a sample, being denied permission from parents for their child to participate in a study, and not being granted access to schools to conduct observations of teachers. Notice how all of these things are out of the control of the researcher. The limitations can usually be presented as a list and then explained further in one or two additional paragraphs.

In the *delimitations of the study* you identify boundaries that you, the investigator, are placing on the study. Here you might state specifically what you will and will not investigate; the number of individuals, classes, or schools to be involved in the study; calendar time to which the study is restricted; or any other boundaries you might wish to impose on the investigation. Some examples of delimitations include constraining your study to include only females, deciding to survey only 300 individuals—as opposed to a larger number—from a large population, and deciding to collect data at the beginning of the school year instead of at the end. These examples represent purposeful decisions made by the researcher. Similarly, delimitations can be presented as a list and further explained in one or two paragraphs.

In this phase of planning you must also define any terms that are not commonly recognized or that you will be using in a special sense.

### Exercise 6.5

For your topic, (1) write three limitations, (2) write three delimitations, and (3) define three terms you will use that a lay reader would not readily understand.

Regarding questions and/or hypotheses, you must (1) state the research questions you will attempt to answer, and/or (2) state the research hypotheses and/or null hypotheses you will use.

You know that some types of research are oriented by questions, others by hypotheses, and still others by both. If you intend to use questions to guide your research, you should pose a main research question and then supplement it with a number of related subquestions that help answer the main question, as shown in the following example:

**Problem:** The purpose of this study is to formulate and test a set of procedures for increasing the level of student attention during sixth-grade mathematics instruction.

**Main Question:** Can a set of procedures be devised and implemented that will increase the level of student attention during sixth-grade mathematics instruction?

**Subquestions:**

1. Does evidence indicate that student attention is important during mathematics instruction?
2. What is meant by *paying attention*, and what do students do when paying attention?
3. What materials, techniques, and activities naturally attract and hold student attention?
4. What other factors cause students to pay attention?
5. What have teachers traditionally done to attract and hold student attention during mathematics or other instruction?
6. Can teachers incorporate a planned set of “attention holders” into their lessons?
7. If so, will those efforts produce increases in student attention?

The subquestions are much more limited than the main question. They are also more easily answered and are sequenced so that their answers can help answer the main question. Subquestions provide valuable guidance in planning and conducting the investigation.

### Exercise 6.6

A. Would you consider the following to be a good or poor main research question?

*Are Latino students in Elmwood getting what they should out of school?*

You probably see it is a poor question because it is too vague: “Getting what they should out of school” has no clear meaning. It is also too broad; even if clarified, it covers too much ground.

The question would be acceptable if put in this form:

*How do Latino students compare to other students in Elmwood high schools regarding achievement and attitude toward school?*

The question thus stated directs attention to what the research is to determine. It clarifies the topic and limits it to researchable size.

With these considerations in mind, write a main research question for the problem you have stated.

B. We have noted that answering a main research question is easier when a number of subordinate questions are posed to help answer the main question. The subquestions should be clear and succinct. Evaluate the following subquestions for (C) clarity, (S) succinctness, and (A) answerability.

- \_\_\_\_\_ 1. Do Latino students goof around a lot after school?
- \_\_\_\_\_ 2. Why are Latino students so good in math?
- \_\_\_\_\_ 3. Do Latino students' attitudes toward school differ from the attitudes of other groups of students?
- \_\_\_\_\_ 4. Do Latino students learn math differently from the way students of Asian descent learn it?
- \_\_\_\_\_ 5. Given the incredible disadvantages experienced by certain members of the Latino student community, why do Latino students so frequently, and to such a surprising degree, outstrip their peers in so many different academic areas?

Let us appraise the subquestions: Question 5 is not stated succinctly; all the others are sufficiently brief. Questions 2, 3, and 4 are stated clearly, while questions 1 and 5 are not. Only question 3 is readily answerable; the other questions range from difficult to virtually impossible to answer through research.

C. Subquestions should also be arranged in good sequence, either from simple to more complex or so that prior questions furnish beginning points for questions that follow. Given the main question,

*Are Latino students' achievement levels in high school mathematics affected by their parents' support of education?*

evaluate the following subquestions. Indicate the five questions that contribute best to answering the main research question. If you find the sequence of questions to be unsatisfactory, rearrange them as you believe appropriate.

- \_\_\_\_\_ 1. What are the mathematics achievement levels of Latino high school students?
- \_\_\_\_\_ 2. What do Latino students' parents say about their children's enjoyment of school?
- \_\_\_\_\_ 3. Does the literature suggest a relationship between parental support and school achievement?
- \_\_\_\_\_ 4. How does mathematics achievement among Latino students compare with that of students in general?
- \_\_\_\_\_ 5. Does Latino student achievement in mathematics remain constant through the school years, relative to that of other students?
- \_\_\_\_\_ 6. Is there a correlation between Latino students' mathematics achievement and their parents' attitude toward education?
- \_\_\_\_\_ 7. How does Latino high school students' attitude toward school compare with that of other students?

D. Write out five subquestions to help answer the main research question you composed in part A of this exercise.

If hypotheses are used to guide research, they may be *research hypotheses* (either directional or nondirectional), which state the outcomes the investigator expects, or *null hypotheses*, which usually are not what the investigator expects to find but are satisfactorily testable within the logic of inferential statistics (examined in Chapter 8 and

in Appendix A). To assist you in completing Exercise 6.7, the following examples are provided:

**Research hypothesis:** Mathematics achievement among Latino high school students is positively related to parental support of education.

**Null hypothesis:** No relationship exists between mathematics achievement of Latino high school students and their parents' support of education.

Frequently, both types of hypotheses are used in the same study. The investigator states a research hypothesis to orient the study and then a null hypothesis for testing whether a finding can be attributed to errors made in selecting the sample.

### Exercise 6.7

- A. Which of the following hypotheses are stated suitably for guiding practical educational research?
  1. No difference exists in grade point average between sixth-grade students of Asian descent and sixth-grade students of Hispanic descent.
  2. Attitude toward school is better among African American students than among white students.
  3. No difference exists between students of Japanese descent and students of Korean descent regarding genetic capabilities for learning mathematics.
  4. All students should be given equal access to educational opportunity.
- B. Compose a research hypothesis and a null hypothesis for the problem you stated earlier.

## Task 2. Identify Keywords or Descriptors and Outline the Library Search for Related Information

In this task, you should accomplish four things:

1. Select the terms or descriptors for use in the library search.
2. Identify secondary sources to be searched.
3. Identify guides and directories for searching primary sources.
4. Assemble the materials needed for summarizing and citing references.

*Descriptors* are terms related to your research topic that can be found in reference indexes such as *Current Index to Journals in Education (CIJE)*. They are helpful when you use the indexes manually and are indispensable when you use the computer for your search. One of the best aids in identifying appropriate descriptors is the *Thesaurus of ERIC Descriptors*. It can be found in the reference section of the library next to the bound volumes of *CIJE*, near the computer terminals used to search ERIC. Additionally, it is included on the ERIC compact disc (if your library uses the CD-ROM version of ERIC) and can be accessed online within the searchable ERIC databases. When you consult the *Thesaurus*, identify the descriptor that most closely matches the theme of your study and use it first. While it might lead to all the references you need, you should list related descriptors as well, as they sometimes lead to unexpectedly valuable resources.

### Exercise 6.8

For your topic, write three descriptors that might be used in searching the indexes. To facilitate searching, each descriptor should consist of no more than two words.



*Secondary sources*, such as yearbooks, research reviews, and encyclopedias, should be checked manually, using the descriptors you have identified. You should consult secondary sources first because it is likely they will summarize existing research in your topic and provide a review of the topic's historical treatment. Secondary sources are also likely to contain critiques and extensive bibliographies but probably will *not* include the most current research.

### Exercise 6.9

Refer to the list of secondary sources presented in Chapter 4. Write the names of five sources that seem promising for your topic.

*Guides* such as indexes and directories should be consulted next for indications of documents and journal articles that might contain primary information related to your topic. Plan on using first those that can be accessed by computer, such as *Current Index to Journals in Education*, *Resources in Education*, and *Dissertation Abstracts International*.

### Exercise 6.10

Refer to the indexes and directories listed in Chapter 4. Write the names of four that seem most promising for researching your topic.

You should now plan procedures and materials for summarizing and citing information related to your study. Chapter 5 suggested procedures for surveying quantities of materials and accurately making summaries and bibliographical citations.

As you delve into the literature, you may have to make another decision about your topic, depending on what you find. If your topic has already been researched extensively, answers to your questions may exist in the literature, in which case the topic is probably not a good choice for your project. If references to your topic are few or nonexistent, you may need to think through your topic again; it may have inherent problems that have prevented its being researched.

Assuming you have identified a researchable topic you wish to pursue, you can complete the library search as described in Chapters 4 and 5. Remember to organize the citations so as to present first the information that is more *generally* related to your topic and *earlier in publication date* and then proceed to materials that are more *recent* and more *specific* to your topic. That is, you should organize the references so they proceed:

from general → to specific  
and from earlier research → to more recent research

The use of research subquestions to guide your research can also help organize your literature review.

### Exercise 6.11

Indicate which of the following should probably be presented (E) earlier or (L) later in your review of the literature.

- \_\_\_\_\_ 1. In 1997 Wilkinson . . .
- \_\_\_\_\_ 2. Gange's 2005 research showed that . . .
- \_\_\_\_\_ 3. Historically, research on this topic has dealt with . . .

- \_\_\_\_\_ 4. Martínez (2000) described research done at the turn of the century . . .
- \_\_\_\_\_ 5. Present consensus seems to be that . . .
- \_\_\_\_\_ 6. Garibaldi's 1988 findings are still considered to be the most accurate available . . .
- \_\_\_\_\_ 7. Of several similar topics investigated, the following are representative . . .
- \_\_\_\_\_ 8. Of all research, the most pertinent seems . . .

### Task 3. Identify Needed Data and Sources

A number of elements must be considered within this task and should be carefully organized. The elements are as follows:

1. Specify events or conditions about which you need data, usually *one* of the following:
  - Human social behavior, individually or in one or more groups
  - Events or conditions of the present
  - Events or conditions of the past
  - Correlations that permit making predictions and sometimes suggest cause–effect relationships
  - Innovative procedures or products
  - Existing group differences and trends
  - Quality of programs or operational units
  - Relationships that strongly indicate cause and effect

When you identify from the preceding list the event or condition central to the research topic you selected in Exercise 6.1, you have pinpointed the type of research you will undertake. It is important at this point that you read more about the particular type of research you are to pursue, in order to gain a greater understanding of what is involved in obtaining and analyzing data.

#### Exercise 6.12

Use the following chart to select and read the chapter presented in this book that describes the type of research you have identified for your topic. Select the event or condition central to your topic, note the probable type of research, and then read the suggested chapter. Within that chapter, you will find one or more reprinted research reports that exemplify the type of research described in the chapter. After you have read that chapter, return here to continue your planning.

It is assumed at this point that you have, as suggested in this exercise, selected and read a chapter, or portion thereof, pertinent to the type of research appropriate for your topic. We now continue with directions for planning your research project.

| Central event or condition of your topic | Type of research | Read this chapter                        |
|--|------------------|--|
| Human social behavior                    | Ethnographic     | Chapter 10: Qualitative Research Methods |
| Events or conditions of the past         | Historical       | Chapter 10: Qualitative Research Methods |
| Other qualitative                        | Qualitative      | Chapter 10: Qualitative Research Methods |

|  |                                     |  |
|--|-------------------------------------|--|
| Current characteristics of a population                            | Survey                              | Chapter 11: Survey Research  |
| Co-relation between variables                                      | Correlational                       | Chapter 12: Nonexperimental Quantitative Research                        |
| Existing group differences   | Causal-Comparative                  | Chapter 12: Nonexperimental Quantitative Research                        |
| Relationships that show cause and effect                           | Experimental/<br>Quasi-Experimental | Chapter 13: Experimental, Quasi-Experimental, and Single-Subject Designs |
| Topics (above) that require both qualitative and quantitative data | Mixed-Methods                       | Chapter 14: Mixed-Methods Research Designs                               |
| Innovative products or procedures                                  | Action                              | Chapter 15: Action and Evaluation Research                               |
| Quality of programs or operations                                  | Evaluation                          | Chapter 15: Action and Evaluation Research                               |

2. List the kinds of data you need to collect for your research, usually one or more of the following:

- *Descriptions*—verbal summaries of observations
- *Scores or tallies*—test scores or frequency tallies
- *Measurements*—assessments by measuring devices other than tests
- *Opinions*—what people believe
- *Statements*—authoritative pronouncements
- *Analyses*—careful logical scrutiny

3. Pinpoint anticipated sources of data, usually including one or more of the following:

- *Participants*—people participating in the study
- *Procedures*—formal ways of doing things
- *Settings*—physical environments
- *Objects*—tangible things
- *Records*—highly summarized notations
- *Documents*—printed materials, such as articles
- *Informants*—people who provide desired information verbally

### Exercise 6.13

For the topic you have identified for research, first list the kinds of data you will need to collect and then the probable sources of those data.

## Task 4. List the Steps You Will Need to Carry Out to Complete the Study

Use the following suggestions:

1. If you need to select a sample of participants who will furnish data, indicate the kind of sample you believe obtainable and best for your study. Note that additional

information and greater detail for methods of sample selection is provided in Chapter 7.

- **Random sample:** Every person in the population has a chance of being selected.
  - **Stratified sample:** Sample is specially drawn to fairly represent elements of the population, such as various ethnic groups.
  - **Cluster sample:** Sample consists of existing groups, such as classes or schools.
  - **Convenience sample:** Sample consists of whoever happens to be available.
2. Indicate how you will select the sample.
  3. Indicate what the participants, if any, will be expected or required to do. Expectations are normally categorized as one or more of the following:
    - Reorganize or regroup
    - Undergo assessment
    - Receive training, instruction, or other treatments
    - Demonstrate skills or knowledge
    - Interact and behave in their normal fashion

### Exercise 6.14

1. Do you expect to select a sample for your study? If so, indicate the kind of sample and how you will select it.
  2. If you use participants in your study, indicate what you will expect them to do.
- 
4. Indicate how you will obtain data. In most studies, data are collected by one or more of the following:
    - *Notation*—observer makes notes of observations
    - *Description*—observer makes detailed recordings of observations
    - *Analysis*—investigator makes careful logical scrutiny of objects and procedures
    - *Questioning*—investigator or assistant conducts interviews or surveys
    - *Testing*—participants respond to formal tests
    - *Measurement*—assessment is done through use of measuring devices other than tests
  5. Indicate the tools that will be used in collecting data. This is usually one or more of the following:
    - *Recording devices*—pencil, paper, camera, audio and video recorders
    - *Guides*—structure for procedures and questions, as in interviews
    - *Criteria*—standards for judging existence or acceptability
    - *Tests*—commercial standardized tests; sometimes tests constructed by the investigator
    - *Measuring devices other than tests*—rulers, thermometers, weight scales, and the like
    - *Rating scales*—written prompts to which participants respond, such as Likert scales and semantic differential scales
    - *Questionnaires*—sets of questions to which participants respond in writing
  6. Anticipate the form in which data will accumulate (typically one or more of the following):
    - Written descriptions
    - Numerical summaries
    - Categorizations—participants or responses placed in categories

- Hierarchical listings—responses or participants placed in rank order
  - Tallies—marks indicating frequency of occurrences of responses
7. Give attention to how you will ensure the quality of your data, such as by
- Determining legitimacy of source by verifying authenticity, credentials of provider, or measures of validity
  - Determining accuracy of data via credentials of the provider, preponderance of opinion, logical analysis, and statistical measures of reliability

## Task 5. Specify the Procedures and Tools You Will Employ in Collecting Data

This topic was discussed in the preceding paragraphs. You will almost certainly use one or more of the following procedures to obtain data: notation, description, analysis, questioning, testing, and measurement. Depending on the procedures you envision, you will need to use tools such as recording devices, guides, criteria, tests, measuring devices other than tests, rating scales, and questionnaires.

### Exercise 6.15

For the data you anticipate obtaining in your study

1. List the specific steps you will follow and tools you might use in collecting data.
2. Indicate how you expect to organize data prior to analysis.
3. Explain how you will attempt to ensure quality of your data.

## Task 6. Foresee How Data Can Best Be Analyzed and Interpreted

### Data Analysis

Procedures for analyzing data vary according to type of data and research questions and/or hypotheses.

Previously we saw that *qualitative* and *quantitative* are the two general types of data and that they must be analyzed differently. Qualitative data are for the most part narrative or verbal, whereas quantitative data are for the most part numerical. A certain amount of overlap exists between the two types. The following is what you should give attention to:

1. State how you will analyze **qualitative data**, if such analysis is appropriate. This usually involves logically matching data with research questions. In ethnographic studies, analysis involves identifying topics, categories, and patterns that ultimately lead to interpretations, from which conclusions are reached concerning the research questions asked. (Techniques of qualitative data analysis are described in Chapter 8.)
2. State how you will analyze **quantitative data**, if such analysis is appropriate. This usually involves statistical procedures that result in
  - Numerical descriptions of central tendency, variability, correlations, differences, and relative standings, and/or
  - Statistical inferences about standard error, probability, and significance

Techniques for analyzing quantitative data are described in Chapter 8 and in Appendix A.



Research  
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qualitative data

quantitative data

## Exercise 6.16

For the data you anticipate

1. Will you need to use qualitative analysis or quantitative analysis? Explain why.
2. If quantitative analysis is indicated, do you expect to explore status of groups, differences between or among groups, or relationships between or among variables?

### Analysis Applied to Answering Questions and Testing Hypotheses

*Research questions* are answered through logic and accumulation of evidence. *Qualitative analysis* requires a strong verbal argument, enough to be very persuasive. *Quantitative analysis* describes data numerically and often requires the application of statistical tests to help determine whether the findings exist in the population as well as in the sample.

*Hypotheses*, as we have seen, are tested statistically. Statistical tests provide the rationale for either retaining or rejecting your hypotheses, thus suggesting whether or not your findings are probably “real.” You also use logic to support the inferences you make about your hypotheses.

### Findings

*Findings* are statements that explain what your data analysis has revealed. Presented verbally, findings are commonly grouped in accordance with the research questions or hypotheses to which they pertain. For example, given the research question

How do Latino students compare to other students in Elmwood high schools regarding achievement and attitude toward school?

You might properly present your findings as follows:

*Question 1:* How do Latino students compare to other students in Elmwood high schools as concerns achievement and attitude toward school?

*Findings:* With regard to this question, it was found that

1. Latino students’ achievement test scores, compared to other students in Elmwood high schools, were. . . .
2. Latino students’ attitude toward school, compared to that of all other students in Elmwood high schools, was. . . .

Although findings are expressed verbally, it is expected that they should be referenced to the analytical procedures on which they are based, which might be shown as:

- Graphic summaries, shown in figures, tables, and graphs, and/or
- Tabular summaries shown in tables, with appropriate statistical tests applied

### Conclusions

*Conclusions*, which are the interpretations you make of your research findings, are also presented verbally. They comprise your reflections on the meaning, significance, and implications of what you have discovered. Using the previous example:

How do Latino students compare to other students in Elmwood high schools regarding achievement and attitude toward school?

You might write

Given the findings of this study, the following conclusions appear to be warranted:

1. Latino students in Elmwood high schools. . . (continue stating your interpretations).

## Exercise 6.17

For the research questions and hypotheses you stated in Exercises 6.6 and 6.7:

1. Indicate the general procedures you would use to answer questions and test hypotheses.
2. Indicate how you would expect to present your findings and conclusions.

## Task 7. Anticipate the Appropriate Report Format for Your Research

Relatively little has been said up to now about formats used for research reports, although you have had direct experience with many. (Chapter 9 provides detailed help with report formats.) For the present, simply recognize the existence of a *generic* format and three variations: the *thesis/dissertation* format, the *technical paper* format, and the *journal article* format.

The generic report format includes:

1. Specification of the problem
2. Review of related literature
3. Procedures and data collection
4. Data analysis

## Applying Technology

### More Guidelines for Reports

Recall that earlier in this text we referred the reader to an electronic text authored by Dr. William Trochim of Cornell University (<http://socialresearchmethods.net>). Included in his online text are two pages that provide excellent guidance in terms of planning for research and, specifically, the writing of a proposal or final research report. The first of these, titled "Key Elements" (<http://socialresearchmethods.net/kb/guideelements.htm>), presents an overview of important criteria that must be addressed in any research report. Even though the author focuses on writing up a completed study, his references to and descriptions of several aspects of a report would also apply to writing a research proposal or plan. In "Key Elements," Dr. Trochim addresses the following aspects:

- *Introduction*
- *Methods*
- *Results*
- *Conclusion, Abstract, and Reference* sections

Included in each of these sections are detailed descriptions of the specific components for each section (e.g., *Methods* includes descriptions of Sample Selection,

Measurement Issues, and the Research Design and Procedures).

The second page, titled "Formatting" (<http://socialresearchmethods.net/kb/formatting.htm>), contains even more detailed descriptions of the specifics of how to format a research proposal or plan. These guidelines follow those provided in the *Publication Manual of the American Psychological Association* (5th edition). Included on this page are descriptions of the contents of individual sections of the research proposal or paper. In addition to the components listed above, Dr. Trochim has also included information on:

- Citing references within the text (i.e., within the literature review)
- Formats for citing references in a reference list
- Information on formatting tables, figures, and appendices

Finally, Dr. Trochim has also included the complete text of a sample research paper (<http://socialresearchmethods.net/kb/sampaper.htm>), exemplifying many of the guidelines presented on his previously mentioned Web pages.

*Tips***FOR ONLINE COURSES**

Working individually or in small groups, have students sketch out a plan for a research study of their own design, while addressing the seven steps listed in the chapter. Assist students in electronically disseminating their plans to classmates. Require students to provide constructive feedback to others on their potential designs via e-mail or discussion groups.

5. Findings
6. Conclusions

The report format that your institution expects you to follow will be a variation of this generic format. You most likely will be expected to use the thesis format adopted by your graduate school. Two other variations frequently used by researchers are the technical paper format, specified by agencies that sponsor research, and the journal article format, specified by particular journals that publish research. By now you have seen many examples of the journal format, and you may also have seen some of the technical paper format.

This completes the instruction on how to prepare for your own research. The following case illustrates how one graduate student planned her research.

## Illustrative Example of Planning a Research Project

Sheila Holly, an experienced teacher adept at working with student teachers, had for some time been interested in exploring whether success in student teaching could be predicted on the basis of student teachers' personal traits. She planned an investigation to pursue that question, following the research phases outlined in the planning guide you have just completed.

### Topic and Problem

The process began when Holly decided she wanted to determine whether student teacher success could be predicted from personal traits. For her working title, she chose "Predicting Success in Student Teaching from Student Teachers' Personal Traits." She then formulated the following problem statement:

The purpose of this study is to determine whether success in student teaching can be predicted from selected personal traits of student teachers.

Holly included a brief statement about the importance of the study, explaining that student teaching is very costly to taxpayers, that better prediction of success would save money and other resources, that reliable predictors of success in student teaching have not been available, and that there has been speculation but no proof that student teaching success depends more on personal factors than on intelligence or grade point average. She contin-

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#### Companion Website Highlight

The Companion Website that accompanies this text ([www.ablongman.com/mertler6e](http://www.ablongman.com/mertler6e)) includes three sample research proposals produced by groups of master's students, as well as a report from a completed research study. They have been provided as examples of various ways of planning a research study and of developing a research plan.



ued by describing the limitations of the study, which had to do with participants available, student teaching placements, and schools and master teachers involved. She also stated the delimitations of the study, which included time duration, personal traits to be investigated, and instruments and procedures that would be used to assess personal traits and success in student teaching. Finally, Holly defined the terms central to her study, including student teaching, success in student teaching, personality, and personal traits.

Holly used both research questions and a null hypothesis in her study. Her null hypothesis was:

No relationship exists between success in student teaching and selected personal traits of student teachers.

Her main research question was:

Can personal traits of student teachers be used to predict success in student teaching?

Subordinate to that main research question were the following subquestions:

1. What are some of the personal traits of student teachers that professors and master teachers consider important to success?
2. Can master teachers and professors of teacher education reach consensus concerning a cluster of personal traits that seem to be essential to success in student teaching?
3. If a group of such traits can be identified, can they be reliably observed and rated in student teachers?
4. If a group of reliably observable traits can be identified and agreed upon, can those traits be assessed by using an instrument such as a rating scale?
5. If student teachers can be assessed with such a scale, can the overall rating procedure be refined sufficiently that accurate predictions can be made from the scale?

## Examination of the Literature

With those preliminary tasks completed, Holly went to the library to determine the extent to which her topic had been researched. She examined primary and secondary sources, systematically annotating references that had bearing on her research questions. She found some mention of her topic, but no research or practice that suggested that personal traits could, or could not, reliably serve as predictors. She, therefore, decided to proceed with her study.

## Required Data and Data Sources

Holly saw that her study involved two main components. The first was the identification and validation of possible predictors of success that could be built into an assessment instrument. The second was to determine whether a correlation existed between personal traits thus identified and student teaching success. The focus of the first component was *innovation*. The needed data seemed to be expert opinion, and the best source of those data seemed to be experienced teachers and professors of education, accustomed to working with student teachers.

The focus of the second component was on correlations for *making predictions*. The needed data seemed to be (1) scores depicting traits of student teachers, and (2) measures of candidates' later success in student teaching. Those data would be obtained from participants (i.e., student teachers) involved in the study.

Holly used a cluster sample to obtain data. The cluster consisted of 38 student teachers under her direction during the fall term. She explained the proposed study to those students,

and all of them agreed to undergo assessment regarding personal traits and performance in student teaching.

For developing the trait assessment instrument, Holly counted on the help of master teachers and university professors of education. She planned to conduct discussions and interviews with those colleagues, hoping they could identify a pool of personal traits that they believed important to success in student teaching. If they could do so, Holly would analyze the traits to determine which might be assessable through observation or measurement. She would then incorporate those traits, illustrated with example behaviors, into a rating scale that could be used by professional educators who were working with student teachers. She planned to have the professionals evaluate the rating scale, suggest modifications, and then use the scale to assess the selected personal traits of the students. Holly intended to assess all 38 student teachers personally as well, and in addition to ask student teachers to use the instrument to assess themselves.

Data having to do with success in student teaching would come from the end-of-term evaluations routinely completed for student teachers, plus the professionals' appraisals of where each student teacher seemed to rank among student teachers in general.

Holly planned to obtain both qualitative and quantitative data from the assessments and evaluations. Because she feared that the trait assessment instrument and the final evaluation form might produce unreliable or even misleading numerical data, she planned to have professionals participating in the study keep detailed records of each student teacher's performance.

Holly planned to make a dual analysis of the qualitative and quantitative data, in order to compare the ratings of each student teacher as made by the master teacher, the university professor, the student, and Holly herself. She planned to correlate the numerical data from the assessment instrument and the student teaching final evaluation forms. At the same time she planned to explore qualitatively the correspondence between personal traits and student teaching success.

## Appraisal of Holly's Plan

Holly may or may not be successful in what she proposes to accomplish. She must contend with serious questions about the validity and reliability of the trait assessment instrument she hopes to develop. Also, the reliability of student teacher evaluations is always in question. These factors will leave some uncertainty about any conclusions Holly reaches. Despite these serious concerns, Holly's topic is important and worth exploring. She may well uncover valuable and generalizable findings. But she will have to obtain statistically significant results and build powerful logical arguments if she is to answer her questions convincingly.



## An Example of a Research Proposal

The following is a brief example of an actual research proposal. It is the proposal that preceded the actual published exemplar study which appears in Chapter 11 ("An Analysis of

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#### Companion Website Highlight

The Companion Website for this text ([www.ablongman.com/mertler6e](http://www.ablongman.com/mertler6e)) also includes a downloadable, printable proposal rating scale. It can be used to assist you in the development of a research plan or to evaluate an existing one. Save or print the form and use it to assist you in planning for a research study.

Secondary School Principals' Perceptions of Multicultural Education" by McCray, Wright, & Beachum, *Education*, 2004). It is reprinted here by permission of Carlos R. McCray.

# AN ANALYSIS OF SECONDARY SCHOOL PRINCIPALS' PERCEPTIONS OF MULTICULTURAL EDUCATION

Carlos R. McCray, Ed.D.

Assistant Professor, Department of Educational Leadership  
Central Connecticut State University

James V. Wright, Ed.D.

Department Head/Professor, Department of Counselor, Leadership  
& Special Education  
Auburn University-Montgomery

Floyd D. Beachum, Ed.D.

Assistant Professor, Department of Administrative Leadership  
University of Wisconsin-Milwaukee

## INTRODUCTION

The purpose of this study is to identify whether or not secondary school principals' perceptions of multicultural education differ as it relates to school and community characteristics and to personal and professional characteristics of the administrator in a designated southeastern state.

## RESEARCH QUESTIONS

1. Do high school principals' perceptions differ with regard to the negative value of multicultural education as it relates to school and community characteristics (school's location, whether urban, suburban, and rural, socioeconomic status of the school, school size, and racial make-up of the school)?
2. Do high school principals' perceptions differ with regard to the negative value of multicultural education as it relates to personal characteristics (gender and ethnic identity)?
3. Do high school principals' perceptions differ with regard to the negative value of multicultural education as it relates to professional characteristics (years of administrative experience each principal has, whether or not they have attended a professional multicultural workshop within the last year, and educational achievement)?

## RATIONALE

There is an increasing minority student population in the United States (Patrick & Reinhartz, 1999), and multicultural education promotes diversity to the fullest extent (Banks & Banks, 1989). It is the school culture which has a substantial impact on a student's success (Beachum & McCray, 2004; Karpicke & Murphy, 1996). Thus, it is ultimately the school principal who sets the tone and has the greatest influence on the school's culture (Capper, 1993; Decker, 1997).

## METHODOLOGY

The target and accessible population for this study will consist of grade levels: 7-12, 8-12, 9-12 and in special

circumstances grade levels 1-12. All secondary schools in our designated southeastern state with the exception of vocational, private, and parochial schools will be selected for the study. The participants of the study will be asked to share their perceptions of multicultural education on a four-point Likert Scale Survey. A response of "1" will indicate that the respondent strongly disagrees with the question items. A response of "2" will indicate that the respondents disagree with the question items. A response of "3" will indicate that the respondent agrees with the question items, and a response of "4" will indicate that the respondent strongly agrees with the items on the survey. Descriptive statistics for the survey responses will be calculated, in addition to inferential comparisons. Prior to these tests, a level significance of .05 will be set for each test.

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## Developmental Activity

### Planning for Your Research

This chapter's developmental activity is essentially a compilation of many of the exercises that you have already examined earlier in this chapter but in a more streamlined format. Think about the work you have done in previous chapters' developmental activities and respond to the following:

1. My preliminary research problem or topic is: \_\_\_\_\_
2. The type of research that seems most appropriate is: \_\_\_\_\_
3. My research questions and/or hypotheses include: \_\_\_\_\_
4. My justification for investigating this problem or topic (i.e., why I would argue that it is an important topic to investigate) is: \_\_\_\_\_

## Introduction to Educational Research

### Companion Website Highlight

Finally, the Companion Website for this text ([www.ablongman.com/mertler6e](http://www.ablongman.com/mertler6e)) includes a downloadable, printable version of a comprehensive guide for planning educational research. It has been structured as a checklist and allows you to monitor your progress when planning for a research study. Save or print the checklist and use it to assist you in planning your research study.

5. The main variables for my study include: \_\_\_\_\_
6. Descriptors that I am using for the identification of related literature include: \_\_\_\_\_
7. The following constitutes a potential outline of the major sections of my literature review:
  - I. \_\_\_\_\_
  - II. \_\_\_\_\_
  - III. \_\_\_\_\_
  - IV. \_\_\_\_\_
  - V. \_\_\_\_\_
8. My intended sample consists of (who and how many): \_\_\_\_\_
9. The type of sampling (if any) that seems most appropriate is: \_\_\_\_\_
10. The type(s) of tool(s) that I plan to use to collect data is/are as follows: \_\_\_\_\_
11. The following statistical techniques will be used to analyze my data—and ultimately answer my research questions/hypotheses: \_\_\_\_\_

(A downloadable, interactive version of this developmental activity is available from the Companion Website, [www.ablongman.com/mertler6e](http://www.ablongman.com/mertler6e))

## Chapter Summary

Careful advance planning is *extremely* important if research is to give attention to necessary components, remain focused, and be finalized correctly and expeditiously. Attention must

be given to each of the seven tasks discussed in this chapter, because all are essential and critical components of the process of designing and conducting a research study.

## List of Important Terms

cluster sample  
convenience sample

null hypothesis  
problem

qualitative data analysis  
quantitative data analysis

random sample  
research design

research hypothesis  
stratified sample

subquestions

## Your Current Status

In this chapter, you have seen how research is planned. You are familiar with seven principal tasks to be completed when planning research. By completing the chapter exer-

cises you have outlined a plan for actual research of your own that you should be able to use with confidence.

## Activities for Thought and Discussion

Using the planning guide, develop an outline, consisting of no more than one page, of an investigation into one of the following topics:

1. Why students such as the members of your class pursue graduate studies in education
2. A comparison of the lecture–discussion method versus the self-guided study method for promoting achievement in classes in educational research
3. Factors that might serve to improve teacher morale and job satisfaction
4. The lines of work teachers believe they would prefer if they had career choices to make over again

## References and Recommended Readings

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