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**LECTURE COURSE ON DISCIPLINE**

**« The Educational Research »**

for master students of the Foreign Languages ​​ Faculty, the specialty 7М01701901 «Foreign language: two foreign languages»

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### **Lecture 1**: The Process of ConductingResearch Using Quantitative and Qualitative Approaches

Lecture plan

1. Role and Importance of Research
   1. Research adds to our knowledge
   2. Research improves practice
2. The six steps in the process of research
3. The characteristics of quantitative and qualitative research in each of the six steps
   1. Quantitative research characteristics
   2. Qualitative research characteristics
4. **Role and Importance of Research**

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.

Research is important for three reasons.

* 1. **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.

Suppose that you decide to research how elementary schoolchildren learn social skills. If you study how children develop social skills, and past research has not examined this topic, your research study addresses a gap in knowledge.

* 1. **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. Zeichner (1999) summarized the impact of research on teacher training during this period (see Table 1.1). Teacher trainers today know about the academic capabilities of students, the characteristics of good teacher training programs, the recurring practices in teacher training programs, the need to challenge student beliefs and worldviews, and the tensions teacher educators face within their institutions. But before these research results can impact teacher training or any other aspect of education, individuals in educational settings need to be aware of results from investigations, to know how to read research studies, to locate useful conclusions from them, and to apply the ﬁndings to their own unique situations. Educators using research may be teachers in preschool through Grade 12, superintendents in school district ofﬁces, school psychologists working with children with behavioral problems, or adult educators who teach English as a second language. Research may help these individuals improve their practices on the job.

Research offers practicing educators new ideas to consider as they go about their jobs. From reading research studies, educators can learn about new practices that have beentried in other settings or situations.

1. **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, 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

**The Research Process Cycle**

**FIGURE 1.**

Specifying a Purpose for Research

* Identifying the purpose statement
* Narrowing the purpose statement toresearch

questions or hypotheses

Collecting Data

* Selecting individuals tostudy
* Obtainingpermissions
* Gatheringinformation

Reporting and

Evaluating Research

* Deciding onaudiences
* Structuring thereport
* Writing the report sensitively

Analyzing and

Interpreting Data

* Breaking down thedata
* Representing thedata
* Explaining thedata

Reviewing the Literature

* Locatingresources
* Selectingresources
* Summarizingresources

Identifying a Research Problem

* Specifying a problem
* Justifyingit
* Suggesting the need to study it foraudiences
  1. **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. Consider the following “problems,” each of which merits research:

 Teens are not learning how to connect to others in their communities

 Teenage smoking will lead to many premature deaths

These needs, issues, or controversies arise out of an educational need expressed by teachers, schools, policy makers, or researchers, and we refer to them as research problems. You will state them in introductory sections of a research report and provide a rationale for their importance. In a formal sense, these problems are part of a larger written section called the “statement of the problem,” and this section includes the topic, the problem, a justiﬁcation for the problem, and the importance of studying it for speciﬁc audiences such as teachers, administrators, or researchers.

Let’s examine Maria’s research to see how she will specify her study’s research problem.

Maria plans to study school violence and weapon possession in schools. She starts with a problem: escalating weapon possession among students in high schools. She needs to justify the problem by providing evidence about the importance of this problem and documenting how her study will provide new insight into the problem.

In her research, Marie will need to identify and justify the research problem that she is studying.

* 1. **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.

* 1. **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.

* 1. **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.

**2.5. 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.

**2.6. 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 andschool 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.

**3. The characteristics of quantitative and qualitative research in each of the six steps**

* 1. **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. Describing a trend means that the research problem can be answered best by a study in which the researcher seeks to establish the overall tendency of responses from individuals and to note how this tendency varies among people. 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 (e.g., attitude toward the school bond issue) or characteristic of individuals (e.g., gender) that researchers study. By explaining a relation among variables, you are interested in determining whether one or more variables might inﬂuence another variable. For example, quantitative researchers may seek to know why certain voters voted against the school bond issue. The variables, gender and attitude toward the quality of the schools, may inﬂuence individuals’ vote on the bond issue.

For example, examine the sample quantitative article the parent involvement study at the end of this chapter. The authors in the parent involvement study (Deslandes & Bertrand, 2005) are less interested in describing the level of parent involvement in secondarylevel schooling and more interested in examining the relationship between four factors parents’ role construction, selfefﬁcacy, perceptions of teacher invitations, and perceptions of adolescent invitations as predictors of parent involvement at home and at school. To examine this relation, they collect survey data from 770 parents of children in Grades 7, 8, and 9 (American system equivalents to Canadian schools). Thus, the problem being addressed is that we know little about what factors relate to parental involvement in secondary level schooling. Assessing whether certain factors predict an outcome is best suited to quantitative research.

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. Examples of instruments are survey questionnaires, standardized tests, and checklists that you might use to observe a student’s or teacher’s behaviors.You administer this instrument to participants and collect data in the form of numbers. For instance, you might collect responses based on students checking boxes on a form, or from checklists you complete as you watch a student perform a task in the classroom. The intent of this process is to apply the results (called generalizing the results) from a small number of people to a large number. The larger the number of individuals studied, the stronger the case for applying the results to a large number of people.

In reporting and evaluating quantitative research, the overall format for a study follows a predictable pattern: introduction, review of the literature, methods, results, and discussion. This form creates a standardized structure for quantitative studies. In addition, it also leads to speciﬁc criteria that you might use to judge the quality of a quantitative research report.

* 1. **Qualitative research characteristics**

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. For example, the literature may not adequately address the use of sign language in distance education courses. A qualitative research study is needed to explore this phenomenon from the perspective of distance education students. Unquestionably, using sign language in such courses is complex and may not have been examined in the prior literature. A central phenomenon is the key concept, idea, or process studied in qualitative research. Thus, the research problem of the difﬁculty in teaching children who are deaf requires both an exploration (because we need to better know how to teach these children) and an understanding (because of its complexity) of the process of teaching and learning.

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. The reason for this is that qualitative research relies more on the views of participants in the study and less on the direction identiﬁed in the literature by the researcher. Thus, to use the literature to fore shadow or specify the direction for the study is inconsistent with the qualitative approach of learning from participants. For example, one qualitative researcher who studied bullying in the schools cited several studies at the beginning of the research to provide evidence for the problem but did not use the literature to specify the research questions. Instead, this researcher attempted to answer in the research the most general, open question possible, “What is bullying?,” and to learn how students constructed their view of this experience.

**References**

1. Zeichner, K. (1999). The new scholarship in teacher education. Educational Researcher, 28(9), 4–15

2. Kerlinger, F. N. (1972). Behavioral research: A conceptual approach. New York: Holt, Rinehart and Winston.

3. Leedy, P. D., & Ormrod, J. E. (2001). Practical research: Planning and design (7th ed.). Upper Saddle River, NJ: Prentice Hall.

4. Deslandes, R., & Bertrand, R. (2005). Motivation of parent involvement in secondarylevel schooling. Journal of Educational Research, 98(33), 164–175.

**Lecture 2**: **Identifying a research problem**

Lecture plan:

* 1. What is a research problem and why is it important?
  2. Should the problem be researched?
  3. How do you write a “statement of the problem” section?
  4. The Research problem
  5. Justification of the Importance of the problem
  6. **What is a research problem and why is it important?**

One of the most challenging aspects of conducting research is to clearly identify the “problem” that leads to a need for your study. Individuals do not seem to give enough attention to why they are conducting their studies. Research problems are the educational issues, controversies, or concerns that guide the need for conducting a study. Good research problems can be found in our educational settings, such as:

1. The disruptions caused by at risk students in classrooms

2. The increase in violence on college campuses

3. The lack of parental involvement in schools for students with challenging behaviors

These problems concern personnel in our schools, classrooms, and college campuses. In writing about the research problem, authors state it as a single sentence or several sentences in a research report. To locate the research problem in a study, ask yourself:

 What was the issue, problem, or controversy that the researcher wanted to address?

 What controversy leads to a need for this study?

 What was the concern being addressed “behind” this study?

 Is there a sentence like “The problem addressed in this study is...”

You can ﬁnd “problems” in the introduction to a study. They are included in a passage called the “statement of the problem” section. You can locate this passage in the opening, introductory paragraphs of a research report.

We study research problems so we can assist policy makers when they make decisions, help teachers and school ofﬁcials solve practical problems, and provide researchers with a deeper understanding of educational issues. From a research standpoint, specifying a research problem in your study is important because it sets the stage for the entire study. Without knowing the research problem, readers do not know why the study is important and why they should read the study. What are some educational issues that you might research? Write down these issues.

* 1. **Should the problem be researched?**

One important reason for engaging in research is to add to existing information and to inform our educational practices. Research adds to knowledge. Now let’s examine these ways in more detail as you think about the research problem in one of your studies.

There are ﬁve ways to assess whether you should research a problem:

1. Study the problem if your study will ﬁll a gap or void in the existing literature. Astudy ﬁlls a void by covering topics not addressed in the published literature. For example, assume that a researcher examines the literature on the ethical climate on college campuses and ﬁnds that past research has examined the perceptions of students, but not of faculty. This is a void or gap in the body of research about this issue. Conducting a study about faculty perceptions of the ethical climate would address a topic not studied in the current literature.

2. Study the problem if your study replicates a past study but examines different participants and different research sites. The value of research increases when results can apply broadly to many people and places rather than to only the setting where the initial research occurred. This type of study is especially important in quantitative experiments.

In a quantitative study of ethical climate, for example, past research conducted in a liberal arts college can be tested (or replicated) at other sites, such as a community college or major research university. Information from such a study will provide new knowledge.

3 . Study the problem if your study extends past research or examines the topic morethoroughly. A good research problem to study is one in which you extend the research into a new topic or area, or simply conduct more research at a deeper, more thoroughlevel to understand the topic. For example, in our illustration on ethical climate, although research exists on ethical climates, it now needs to be extended to the situation in which students take exams, because taking exams poses many ethical dilemmas for students. In this way, you extend the research to new topics. This extension is different from replication because you extend the research to these topics rather than participants and research sites.

4. Study the problem if your study gives voice to people silenced, not heard, or rejected in society. Your research adds to knowledge by presenting the ideas and the words of marginalized (e.g., the homeless, women, racial groups) individuals. For example, although past studies on ethical climate have addressed students on predominantly white campuses, we have not heard the voices of Native Americans on this topic. A study of this type would report and give voice to Native Americans.

5. Study the problem if your study informs practice. By examining the problem, your research may lead to the identiﬁcation of new techniques or technologies, the recognition of the value of historical or current practice, or the necessity of changing current teaching practice. Individuals who beneﬁt from practical knowledge may be policy makers, teachers, or learners. For example, a study of ethical issues in a college setting may lead to a new honor code, new policies about cheating on exams, or new approaches to administering tests.

* 1. **How do you write a “statement of the problem” section?**

After you have identiﬁed your research problem, determined that it can and should be researched, and speciﬁed either the quantitative or qualitative approach, it is time to begin writing about the “problem” in a statement of the problem section that introduces your research study.

The statement of the problem section includes the actual research problem as well as four other aspects:

1. The topic

2. The research problem

3. A justiﬁcation of the importance of the problem as found in the past research and inpractice

4. The deﬁciencies in our existing knowledge about the problem

5. The audiences that will beneﬁt from a study of the problem

By identifying these ﬁve elements, you can easily understand introductions to research studies and write good introductions for your own research reports.

**The Topic**

The opening sentences of a “statement of the problem” section need to encourage readers to continue reading, to generate interest in the study, and to provide an initial frame of reference for understanding the entire research topic. Given these factors, it makes sense to start with a broad topic that readers can easily understand. In this way, you bring readers into a study slowly and encourage them to read beyond the ﬁrst page.

An educational topic is the broad subject matter that a researcher wishes to address in a study and that creates initial interest for the reader.

* 1. **The Research problem**

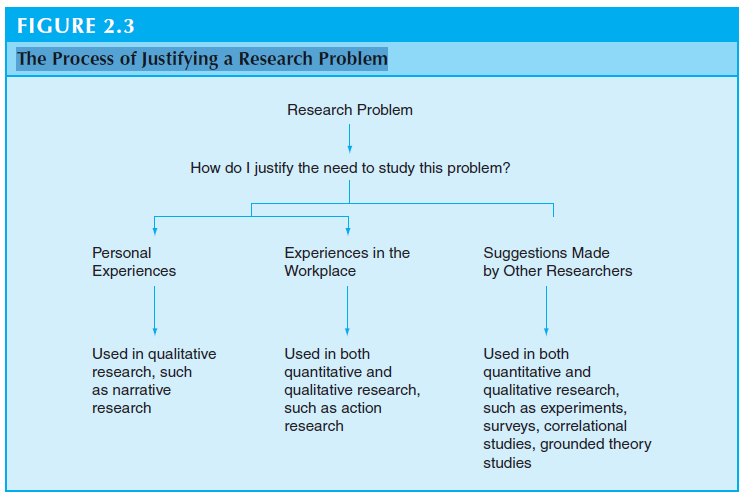
After stating the topic in the opening discussion, you then narrow the topic to a speciﬁc research problem or issue. Recall that a research problem is an educational issue, concern, or controversy that the researcher investigates. Authors may present it as a single sentence or as a couple of short sentences. Also, authors may frame the problem as a deﬁciency in the literature, such as we know little about the factors that lead parents tobe involved in their adolescents’ schooling (Deslandes & Bertrand, 2005).

What types of research problems do you study? Sometimes research problems come from issues or concerns found in schools or other educational settings. We will call thesepractical research problems. For example, can you see the practical issue in the following research problem posed about the Chinese policy toward singlechild families?

Since the late 1970s a single child policy has been implemented by the Chinese government to control the largest population in the world. Selective abortion to choose a boy could inevitably skew the Chinese gender distribution, and is clearly prohibited by the government. As a result, although boys were valued higher than girls in traditional Chinese culture, many parents eventually have a girl as their single child. (Wang & Staver, 1997, p. 252)

The practical problem in this study was that boys were valued more than girls and the policy controls people in the population.

**Figure 2 Justification of the Importance of the problem**



It is not enough to state the problem or issue. You also need to provide several reasons that explain why this issue is important. Justifying a research problem means presenting reasons for the importance of studying the issue or concern. This justiﬁcation occurs in several paragraphs in an introduction in which you provide evidence to document theneed to study the problem.As shown in Figure 2 above, you can justify the importance of your problem by citing evidence from:

* Other researchers and experts as reported in the literature
* Experiences others have had in the workplace
* Personal experiences

These justiﬁcations draw from different sources, are used in different types of approaches (i.e., quantitative or qualitative), and typically ﬁnd expression in select research designs such as experiments, action research, or narrative research.

**References**

1. Deslandes, R., & Bertrand, R. ( 2005). Raisons qui motivent les parents à participer au suivi scolaire de leur enfant du primaire. [Reasons that motivate parents to be involved in their child’s schooling at the elementary level]. Manuscript submitted for publication.

2. Wang, J., & Staver, J. R. (1997). An empirical study of gender differences in Chinese students’ science achievement. Journal of Educational Research, 90,252–255.

### **Lecture 3**: Reviewing the Literature

### **Lecture plan**

3.1 What is a literature review and why is it important?

3.2 How does the Literature Review Differ for Quantitative and Qualitative Studies?

3.3 What are the five steps in conducting a literature review?

3.4 Use Both Primary and Secondary Sources

3.5 Databases

**3.1 What is a literature review and why is it important?**

A **literature review** is a written summary of journal articles, books, and other documents that describes the past and current state of information on the topic of your research study. It also organizes the literature into subtopics, and documents the need for a proposed study. In the most rigorous form of research, educators base this review mainly on research reported in journal articles. A good review, however, might also contain other information drawn from conference papers, books, and government documents. In composing a literature review, you may cite articles that are both quantitative and qualitative studies. Regardless of the sources of information, all researchers conduct a literature review as a step in the research process.

Why is this review necessary? Many reasons exist. You conduct a literature review to document how your study adds to the existing literature. A study will not add to the literature if it duplicates research already available. Like Maria, you conduct a literature review to convince your graduate committee that you know the literature on your topic and that you can summarize it. You also complete a literature review to provide evidence that educators need your study. You may base this need on learning new ideas, sharing the latest ﬁndings with others or identifying practices that might improve learning in your classroom. Conducting a literature review also builds your research skills of using the library and being an investigator who follows leads in the literature, all useful experiences to have as a researcher. Reading the literature also helps you learn how other educators compose their research studies and helps you ﬁnd useful examples and models in the literature for your own research. By conducting a literature search using computer databases, you develop skills in locating needed materials in a timely manner.

**3.2 How does the Literature Review Differ for Quantitative and Qualitative Studies?**

In a quantitative study, researchers discuss the literature extensively at the beginning of a study (see Deslandes & Bertrand, 2005).This serves two major purposes: it justiﬁes the importance of the research problem, and it provides a rationale for the purpose of the study and research questions or hypotheses.In many quantitative studies, the authors include the literature in a separate section titled “Review of the Literature” to highlight the important role it plays.The authors also incorporate the literature into the end of the study, comparing the results with prior predictions or expectations made at the beginning of the study.

In a qualitative study, the literature serves a slightly different purpose. Similar to quantitative research, the authors mention the literature at the beginning of the study to document or justify the importance of the research problem (Shelden et al., 2010). However, authors do not typically discuss the literature extensively at the beginning of a study. This allows the views of the participants to emerge without being constrained by the views of others from the literature. In some qualitative studies, researchers use the literature to support the ﬁndings. Nevertheless, in many qualitative projects, researchers often cite the literature at the end of the study as a contrast or comparison with the major ﬁndings in the study. In qualitative inquiry, researchers do not make predictions about ﬁndings. They are more interested in whether the ﬁndings of a study support or modify existing ideas and practices advanced in the literature for example, expand on the understanding of trust as mentioned in the introduction to the mothers’ trust in principals qualitative study (Shelden et al., 2010).

**3.3 What are the five steps in conducting a literature review?**

Regardless of whether the study is quantitative or qualitative, common steps can be used to conduct a literature review. Knowing these steps helps you read and understand a research study. If you conduct your own research study, knowing the steps in the process will give you a place to start and the ability to recognize when you have successfully completed thereview.

Although conducting a literature review follows no prescribed path, if you plan to design and conduct a study, you will typically go through ﬁve interrelated steps. If you are simply looking for literature on a topic for your own personal use or for some practical application, only the ﬁrst four steps will apply. However, learning all ﬁve steps will provide a sense of how researchers proceed in reviewing the literature. These steps are:

1. *Identify key terms* to use in your search for literature.
2. *Locate literature* about a topic by consulting several types of materials and databases, including those available at an academic library and on theInternet.
3. *Critically evaluate and select the literature* for your review.
4. *Organize the literature* you have selected by abstracting or taking notes on the literatureanddevelopingavisualdiagramofit.
5. *Write a literature review* that reports summaries of the literature for inclusion in your researchreport.

Identify Key Terms

Begin your search of the literature by narrowing your topic to a few key terms using one or two words or short phrases. You should choose these carefully because they are important for initially locating literature in a library or through an Internet search. To identify these terms, you can use several strategies, outlined below:

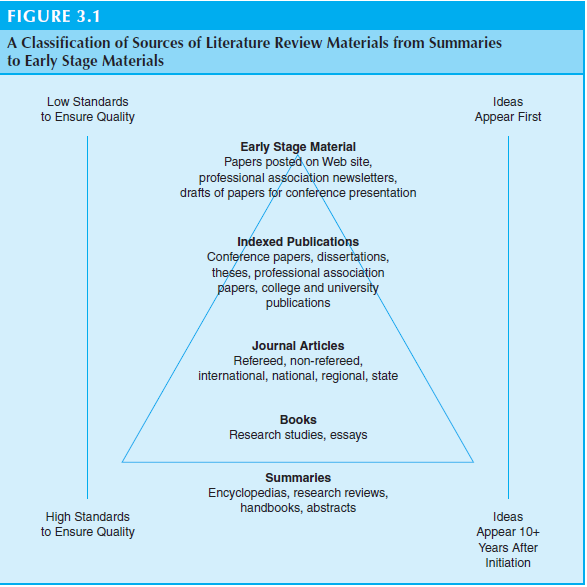
* Write a preliminary “working title” for a project and select two to three key words in the title that capture the central idea of your study. Although some researchers write the title last, a working title keeps you focused on the key ideas of the study. Because it is a “working” title, you can revise it at regular intervals if necessary during the research (Glesne & Peshkin, 1992).
* Pose a short, general research question that you would like answered in the study. Select the two or three words in this question that best summarize the primary direction of thestudy.
* Use words that authors report in the literature. In some quantitative research studies, educators test a prediction for what they expect to ﬁnd from the data. This prediction is an explanation for what researchers hope to ﬁnd. Researchers use the term *theory* for these explanations, and they might be a theory of “social support” or “learning styles” of students. The actual words of the theory (e.g., “social support” or “learning styles”) become the words to use in your search.
* Look in a catalog of terms to ﬁnd words that match your topic. Visit online databases that are typically available in college or university libraries. Forexample, one data base is the **ERIC database** (see Educational Resources Information Center [ERIC], 1991; [**www.eric.ed.gov/**).](http://www.eric.ed.gov/)) ERIC provides free access to more than 1.2 million bibliographic records of journal articles and other education related materials and, if available, includes links to full text. ERIC is sponsored by the U.S.Department of Education, Institute of Education Sciences (IES).
* Go to the bookshelves in a college or university library, scan the table of contents of education journals from the last 7 to 10 years, and look for key terms in titles to the articles. You can also examine the electronic database called *Ingenta* at your academic library. Ingenta supplies access to full text online publications and journal publications. Especially helpful is the “browse publications” feature, in which you enter the name of the journal you wish to examine and obtain a list of the titles of articles from that journal for selectyears.

**3.4 Use Both Primary and Secondary Sources**

Literature reviews often contain both primary and secondary source materials. **Primary source literature** consists of literature reported by the individual(s) who actually conducted the research or who originated the ideas. Research articles published by educational journals are an example of this type of source. **Secondary source literature**, however, is literature that summarizes primary sources. It does not represent material published by the original researcher or the creator of the idea. Examples of secondary sources are handbooks, encyclopedias, and select journals that summarize research, such as the *Review of Educational Research*. Typically, you will locate both primary and secondary sources, but it is best to report mostly primary sources. Primary sources present the literature in the original state and present the viewpoint of the original author. Primary sources also provide the details of original research better than do secondary sources. Secondary sources are helpful as you begin your review, to explore and determine the range of materials on a topic. Historically, the division into primary and secondary sources has been a useful classiﬁcation for literature in ﬁelds such as law and history (Barzun & Graff, 1985).

**Search Different Types of Literature**

Figure 3 provides a useful classiﬁcation system of the literature that you might consider. Modiﬁed from a classiﬁcation originally developed by Libutti and Blandy (1995), the ﬁgure is a guide to resources as well as a framework for getting started in a literature search.



**3.5 Databases**

**Databases** The most likely place to ﬁnd journal articles is in databases that index journal articles both in print form and on CDROMs. A Google search can also often lead totimely articles and discussions on educational topics. A more careful and monitored approach is to examine one of the many literature databases. By examining these databases, you can easily access hundreds of journal articles on educational topics. Computerized databases also facilitate searching the literature for conference papers and miscellaneous publications, such as papers from professional associations or education agencies. You might start a computerized search of the databases with the education data, followed by the psychological and sociological sources of information. Six important databases offer easy retrieval of journal articles and other documents related to education:

ERIC (1991) is a national system of information in education established in 1966 by the U.S. Department of Education and the National Library of Education (NLE). Because public monies supported the development of ERIC, you can search the ERIC database free of charge. You can search this extensive database both online (Internet) and in print forms (available on the book shelves of academic libraries).

Education documents allowed into the ERIC database are selected mainly by reviewers at 16 subcontent clearinghouses (e.g., Adult, Career, and Vocational Education; Assessment and Evaluation). Individuals at these clearing houses examine the educational m aterial, write abstracts, and assign terms or *descriptors* from the ERIC vocabulary to identify each source of information. The literature that goes into ERIC is not peer reviewed for quality, but reviewers at the clearing houses do select it for inclusion in the database.

The ERIC database consists of two parts: journals, located in the *Current Index to Journals in Education* (CIJE; ERIC, 1969–), and documents, found in *Resources in Education* (RIE; ERIC, 1966–). *CIJE* is a monthly and cumulative index to information locatedin approximately 980 major educational and education related journals. It provides a subject index, an author index, and abstracts of speciﬁc studies. *RIE* is a monthly and cumulative index to current research ﬁndings, project and technical reports, speeches, unpublished manuscripts, and books. It indexes education information by subject, personal author, institution, and publication type.

EBSCO Information Services ([**www.ebsco.com/**)](http://www.ebsco.com/)) is a worldwide information service that provides print and electronic subscription services, research database development and production, and online access to more than 150 databases and thousands of ejournals. Academic libraries purchase the services of EBSCO or individuals can purchase articles of interest through the payperview feature. Using EBSCO, the educational researcher can view tables of contents for journals and abstracts to articles, and link directly to full text from over 8,000 titles. Researchers can also receive emails of the tables of contents for their favorite journals as soon as they are published.

**References**

1. Deslandes, R., & Bertrand, R. ( 2005). Raisons qui motivent les parents à participer au suivi scolaire de leur enfant du primaire. [Reasons that motivate parents to be involved in their child’s schooling at the elementary level]. Manuscript submitted for publication.

2. Shelden, D. L., Angell, M. E., Stoner, J. B., & Roseland, B. D. (2010). School principals’ influence on trust: Perspectives of mothers of children with disabilities. Journal of Educational Research, 103,159–170.

3. Glesne, C., & Peshkin, A. (1992).Becoming qualitative researchers: An introduction.White Plains, NY: Longman.

4. Libutti, P. O., & Blandy, S. G. (1995). Teaching information retrieval and evaluation skills to education students and practitioners: A casebook of

applications. Chicago: Association of College and Research Libraries.

## **Lecture 4** Specifying a purpose and research questions or hypotheses

## **Lecture plan**

4.1 The Purpose Statement

4.2 Research Questions

4.3 Hypotheses

4.4 Research Objectives

4.5 How to design quantitative purpose statements, research questions, and hypotheses

4.6 Dependent Variables

4.7 Independent Variables

**4.1 The Purpose Statement**

## The **purpose statement** is a statement that advances the overall direction or focus for the study. Researchers describe the purpose of a study in one or more succinctly formed sentences. It is used both in quantitative and qualitative research and is typically found in the “statement of the problem” section. It often appears as the last sentence of an introduction. You can recognize it because researchers typically state it beginning with the phrase “The purpose of this study is . . .” A quantitative version of this purpose statement addressing teacher–parent communications and student achievement follows:

## The purpose of this study is to examine the relationship between use of Internet communication between teachers and parents in a Midwestern school district and student achievement on tests in high school social studies.

## A qualitative version might be:

## The purpose of this study is to explore parent stories regarding Internet communications with teachers about their students in one Midwestern school district.

## **4.2 Research Questions**

## **Research questions** are questions in quantitative or qualitative research that narrow the purpose statement to speciﬁc questions that researchers seek to answer. Researcherstypically develop them before identifying the methods of the study (i.e., the types of data to be collected, analyzed, and interpreted in a study). Unlike the single statement found in a purpose statement, researchers typically state multiple research questions so that they can fully explore a topic. Research questions are found in both quantitative and qualitative research, but their elements differ depending on the type of research you are conducting. In quantitative research, the questions relate attributes or characteristics of individuals or organizations. Later in the chapter you will learn that these are called variables. In qualitative research, the questions include the central concept being explored. You will learn that this central concept is called a central phenomenon. In some studies, both research questions and purpose statements appear a good presentation style to clarify both the general and speciﬁc directions of a study. The research questions are typically at the end of the introduction of the “statement of the problem” section or immediately following the review of the literature. To locate research questions, you might look for opening passages in which authors identify the research questions they are addressing (e.g., Paragraph 02, Deslandes & Bertrand, 2005). For example, a quantitative research question would be:

## Do parent–teacher Internet communications affect student performance in the classroom?

## A qualitative research question is:

## What types of Internet experiences do parents have with teachers about the performance of the parents’ children?

## **4.3 Hypotheses**

## **Hypotheses** are statements in quantitative research in which the investigator makes a prediction or a conjecture about the outcome of a relationship among attributes or characteristics. Traditionally used in experiments, they serve, like research questions, to narrow the purpose statement to speciﬁc predictions. These predictions are not simply an “edu cated guess.” Rather, researchers base them on results from past research and literature where investigators have found certain results and can now offer predictions as to what other investigators will ﬁnd when they repeat the study with new people or at new sites. You will ﬁnd these hypotheses stated at the beginning of a study, typically at the end of the introduction. Investigators also place them immediately after the review of the literature or in a separate section titled “Hypotheses.” Usually researchers advance several hypotheses, such as three or four. An illustration of a hypothesis is:

## Students in high schools in the school district in which parents and teachers communicate through the Internet will have higher grades than students whose parents and teachers do not communicate through the Internet.

## **4.4 Research Objectives**

## A **research objective** is a statement of intent used in quantitative research that speciﬁes goals that the investigator plans to achieve in a study. Researchers often subdivide objectives into major and minor objectives. They appear frequently in survey or questionnaire studies or in evaluation research in which investigators have clearly identiﬁed objectives. Like hypotheses and research questions, objectives are found at the end of the “statement of the problem” section, after the literature review, or in a separate section of the study.

## You can identify objectives by looking for phrases such as “The objectives in this study are . . .” For instance, the following represent objectives for a study:

## 1. To describe the frequency of Internet communication between parents and teachers regarding the parents’ children in high school social studies classes

## 2. To describe the types (or categories) of Internet communication between parents and teachers

## 3. To relate (a) frequency and (b) types of communication to student achievement in the class as measured by performance on tests.

## Because of the limited use of research objectives in educational research today, our focus in this chapter is on hypotheses and research questions as a means of narrowing and focusing purpose statements.

WHY ARE THESE STATEMENTS AND QUESTIONS IMPORTANT?

These statements are signposts similar to a thesis statement or objectives in term papers you may have written. Without clear signposts, the readers will be lost throughout your study. They simply will not know the central ideas addressed in your study. You can also identify the most appropriate methods for collecting data from the purpose and the questions. They also provide key components for understanding the results of a project. Good research links the purpose statement and questions to major results. To write good purpose statements and research questions, we will begin with some concepts that you need to know, and then establish the building blocks for writing these statements and questions into a study.

4.5 HOW DO YOU DESIGN QUANTITATIVE PURPOSE STATEMENTS, RESEARCH QUESTIONS, AND HYPOTHESES?

To write quantitative purpose statements, research questions, and hypotheses, you need to understand the importance and use of variables. We start with their deﬁnition, talk about the various types used in quantitative research, and then discuss their use in broad theories or explanations.

Specify Variables

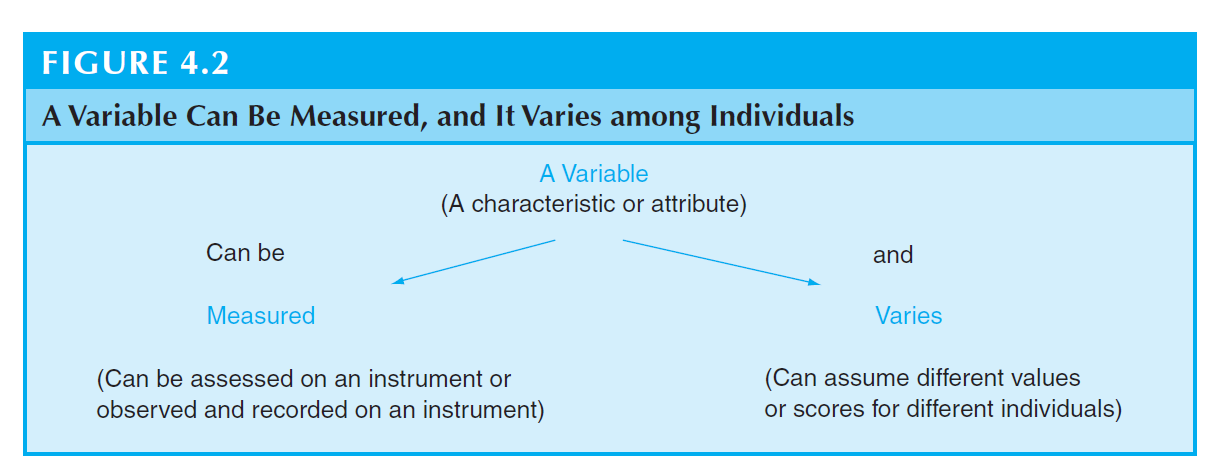
A variable is a characteristic or attribute of an individual or an organization that

(a) researchers can measure or observe and (b) varies among individuals or organizations studied (see Figure 4). They are key ideas that researchers seek to collect information on to address the purpose of their study.

Consider the following examples of variables typically studied in educational research:

* Leadership style (by administrators)
* Achievement in science (by students)
* Interpersonal communication skills (of counselors)

Let’s break this deﬁnition down for close inspection.



Characteristics of individuals refer to personal aspects about them, such as their grade level, age, or income level. An attribute, however, represents how an individual or individuals in an organization feel, behave, or think. For example, individuals have selfesteem, engage in smoking, or display the leadership behavior of being well organized. You can measure these attributes in a study. To practice, you might take out a sheet of paper and write down three personal characteristics and three attributes about your favorite teacher.

Next, consider what it means to “measure” these attributes or characteristics. Measurement means that the researcher records information from individuals in one of two ways:

* Asking them to answer questions on a questionnaire (e.g., a student completes questions on a survey asking about selfesteem)
* Observing an individual and recording scores on a log or checklist (e.g., a researcher watches a student playing basketball and records scores on dribbling techniques)

In either case, student scores will probably vary (hence the name variable). When variables vary, it means that scores will assume different values depending on the type of variable being measured. For example,

* Gender varies by two possible scores: female = 2 and male = 1.
* Selfesteem varies by three possible scores: positive = 3, neither positive nor negative = 2, and negative = 1.

**4.6 Dependent Variables**

A **dependent variable** is an attribute or characteristic that is dependent on or inﬂuenced by the independent variable. You may ﬁnd them labeled in the literature as the outcome, effect, criterion, or consequence variables. Researchers typically investigate multiple dependent variables in a single study (e.g., you hit another car, the other car hit the car in front of it, and so forth), although in many studies, one of the dependent variables is typically of central interest. Dependent variables can be measured using continuous or categorical scores.

Examples of dependent variables in education are achievement scores on a test, the organizational climate of a junior high school, the leadership skills of principals, or the cost effectiveness of student affairs programs in colleges. To locate dependent variables in a study, examine purpose statements, research questions, and hypotheses for outcomes that the researcher wishes to predict or explain. Ask yourself, “What is the outcome in this study?”

**4.7 Independent Variables**

An independent **variable** is an attribute or characteristic that inﬂuences or affects an outcome or dependent variable. Sometimes an intervening variable exists in a research study, and sometimes it does not. In research studies, you will ﬁnd the independent variables called factors, treatments, predictors, determinants, or antecedent variables. Regardless of name, researchers measure this type of variable distinctly (or independently) from the dependent variable, and they identify these variables as worthy of study because they expect them to inﬂuence the outcomes.

Researchers study independent variables to see what effect or inﬂuence they have on the outcome. For instance, consider this research question:

Do students who spend more instructional time in class on math have higher math scores than students who spend less time?

Independent variable: Time on math instruction Dependent variable: Math scores

There are four types of independent variables, and each serves a slightly different purpose: Measured Variable, Control Variable, Treatment Variable, Moderating Variable

**Measured Variable** – an independentvariable that ismeasured in a study.

**Control Variable** – a special type ofindependentvariable that is ofsecondary interestand is neutralizedthrough statistical ordesign procedures.

**Treatment Variable** – an independentvariable manipulatedby the researcher.

**Moderating Variable** – a special type ofindependent variablethat is of secondaryinterest and combineswith anotherindependent variableto inﬂuence thedependent variable.

**References**

1. Deslandes, R., & Bertrand, R. (2005). Raisons qui motivent les parentsа participer au suivi scolaire de leur enfant du primaire. [Reasons that motivate parents to be involved in their child’s schooling at the elementary level]. Manuscript submitted for publication.

**Lecture 5 Collecting Quantitative Data**

FIVE STEPS IN THE PROCESS OF DATA COLLECTION

There are ﬁve steps in the process of quantitative data collection. This process involves more than simply gathering information; it includes interrelated steps. It involves the steps of determining the participants to study, obtaining permissions needed from several individuals and organizations, considering what types of information to collect from several sources available to the quantitative research, locating and selecting instruments to use that will net useful data for the study, and ﬁnally, administering the data collection process to collect data.

5.1 What participants will you study?

5.2 What permissions will you need?

5.3 What information will you collect?

5.4 What instrument will you use to collect data?

5.5 Criteria for choosing a Good Instrument

5.6 How will you administer the data collection?

**5.1 WHAT PARTICIPANTS WILL YOU STUDY?**

The ﬁrst step in the process of collecting quantitative data is to identify the people and places you plan to study. This involves determining whether you will study individuals or entire organizations (e.g., schools) or some combination. If you select either individuals or organizations, you need to decide what type of people or organizations you will actually study and how many you will need for your research. These decisions require that you decide on a unit of analysis, the group and individuals you will study, the procedure for selecting these individuals, and assessing the numbers of people needed for your data analysis.

**Identify Your Unit of Analysis**

Who can supply the information that you will use to answer your quantitative research questions or hypotheses? Some possibilities might be students, teachers, parents, adults, some combination of these individuals, or entire schools. At this early stage in data collection, you must decide at what level (e.g., individual, family, school, school district) the data needs to be gathered. This level is referred to as the unit of analysis. In some research studies, educators gather data from multiple levels (e.g., individuals and schools), whereas other studies involve collecting data from only one level (e.g., principals in schools). This decision depends on the questions or hypotheses that you seek to answer. Also, the data for measuring the independent variable may differ from the unit for assessing the dependent variable. For example, in the study of the impact of adolescent aggression on school climate, a researcher would measure the independent variable, adolescent aggression, by collecting data from individuals while measuring the dependent variable, school climate, based on data from entire schools and their overall climates (e.g., whether students and teachers believe the school curriculum supports learning).

If Maria wants to answer the question “Why do students carry weapons in high school?” what unit of analysis will she study? Alternatively, if she wanted to compare answers to the question “Why do students carry weapons in rural high schools and urban high schools?” what two types of unit of analysis will she study?

**Specify the Population and Sample**

If you select an entire school to study or a small number of individuals, you need to consider what individuals or schools you will study. In some educational situations, you will select individuals for your research based on who volunteers to participate or who is available (e.g., a speciﬁc classroom of students). However, those individuals may not be similar (in personal characteristics or performance or attitudes) to all individuals who could be studied.

A more advanced research process is to select individuals or schools who are reparing typical of the population under study, enabling you to draw conclusions from thesample about the population as a whole. This deﬁnition is loaded with terms, and we will sort them so that you can see alternative procedures for deciding what individuals or organizations to study.

A population is a group of individuals who have the same characteristic. For example, all teachers would make up the population of teachers, and all high school administrators in a school district would comprise the population of administrators. As these examples illustrate, populations can be small or large. You need to decide what group you would like to study.

In practice, quantitative researchers sample from lists and people available. A targetpopulation (or the sampling frame) is a group of individuals (or a group of organizations) with some common deﬁning characteristic that the researcher can identify andstudy.

Within this target population, researchers then select a sample for study. A sample is a subgroup of the target population that the researcher plans to study for generalizing about the target population. In an ideal situation, you can select a sample of individuals who are representative of the entire population. For instance, as shown in Figure 5, you might select a sample of high school teachers (the sample) from the population of all teachers in high schools in one city (the population). Alternatively, you might be able to study only biology teachers in two schools in the city. The ﬁrst scenario represents rigorous, systematic sampling called probability sampling and the second, unsystematic nonprobability sampling.

**FIGURE 5**

**Populations andSamples**

Target Population

Sample

Sample

**Population Sample**

All teachers in high schools inone city A sample of high school teachers College students in allcommunity colleges Students in one community college

Adult educators in all schoolsof education Adult educators in five schools ofeducation

in the Midwest

It is not always possible to use probability sampling in educational research. Instead, a researcher can use nonprobability sampling. In nonprobability sampling, theresearcher selects individuals because they are available, convenient, and represent some characteristic the investigator seeks to study. In some situations, you may need to involve participants who volunteer and who agree to be studied. Further, you may not be interested in generalizing ﬁndings to a population, but only in describing a small group of participants in a study. It may be appropriate to calculate descriptive statistics on these samples and to compare them with the larger population to make inferences from the sample to the population. Researchers use two popular approaches in nonprobability sampling: convenience and snowball sampling approaches.

**Convenience Sampling**

In convenience sampling the researcher selects participantsbecause they are willing and available to be studied. In this case, the researcher cannotsay with conﬁdence that the individuals are representative of the population. However, the sample can provide useful information for answering questions and hypotheses. Let’s look at an example of convenience sampling.

A researcher conducting a study involving Native American students ﬁnd that a large percentage of students in one school are Native Americans. The researcher decides to study this group at this one school because they are available and because the researcher has the permission of the principal and can gain consent from the Native American students to participate in the study. This is a conveniencesample because the participants are convenient to the researcher and are availablefor the study.

**Snowball Sampling**

An alternative to convenience sampling is snowball sampling. Insnowball sampling, the researcher asks participants to identify others to become members of the sample. For example, you might send surveys to a school superintendent andask that the superintendent forward copies to the principals of schools in that schooldistrict. These principals then become members of the sample. This form of sampling has the advantage of recruiting large numbers of participants for the study. By using this process, however, you give up knowing exactly what individuals will be in your sample. It also eliminates the possibility of identifying individuals who did not return the survey, and those responding may not be representative of the population you seek to study. For example, participants who received the survey (e.g., principals who attended the Monday morning meeting with the superintendent) may not be representative of all individuals in the population (in this case, all principals in the school district).

**Sample Size**

When selecting participants for a study, it is important to determine the size of the sample you will need. A general rule of thumb is to select as large a sample as possible fromthe population. The larger the sample, the less the potential error is that the sample willbe different from the population. This difference between the sample estimate and thetrue population score is called sampling error. If you were to select one sample after another, the average score of each sample would likely differ from the true average score for the entire population. For example, if we could obtain scores from sixth graders across the country about the importance of student–parent relationships, the average score might be a 30 on a 50point scale. Of course, we cannot study every sixth grader, so instead we obtain a sample from one school district and get an average score of 35 on the scale. The next time we might obtain a score of 33, and the next time a 36, because our sample will change from one school district to another. This means that our average score is ﬁvepoints, three points, and one point, respectively, away from the “true” population average.

This difference between the sample estimate and the true population score is sampling error. Therefore, since you usually cannot know the true population score, it is important to select as large a sample as possible from the population to minimize sampling error.

In some studies, you may have a limited number of participants who are conveniently available to study. In other cases, factors such as access, funding, the overall size of the population, and the number of variables will also inﬂuence the size of the samples.

One way to determine the sample size is to select a sufﬁcient number of participants for the statistical procedures you plan to use. This presumes that you have identiﬁed the statistic to use in analysis. As a rough estimate, an educational researcher needs:

* Approximately 15 participants in each group in an experiment
* Approximately 30 participants for a correlational study that relates variables
* Approximately 350 individuals for a survey study, but this size will vary depending on several factors.

These numbers are estimates based on the size needed for statistical procedures so that the sample is likely to be a good estimate of the characteristics of the population. They do not provide a precise estimate of the sample size available through sample size formulas.

Sample size formulas provide the means for calculating the size of your sample based on several factors. Use of a formula takes the guesswork out of determining the number of individuals to study and provides a precise estimate of your sample size. The formulas take into consideration several factors important in determining sample size, such as conﬁdence in the statistical test and sampling error. Further, you need not calculate the sample size using a formula. With minimal information, you can identify the sample size using tables available to researchers.

Two formulas used are the sampling error formula for surveys (see Fink & Kosekoff, 1985; Fowler, 2009) and a power analysis formula for experiments (Cohen, 1977; Lipsey, 1990; Murphy & Myors, 1998). Appendix B at the end of the text provides factors that you can insert into these formulas to determine the number of participants for your study.

**5.2 WHAT PERMISSIONS WILL YOU NEED?**

After identifying and selecting participants for your study, you next need to obtain theirpermission to be studied. This permission will ensure that they cooperate in your study andprovide data. Besides cooperation, their permission also acknowledges that they understand the purpose of your study and that you will treat them ethically. Federal legislationrequires that you guarantee them certain rights and that you request their permission to be involved in your study.

**Obtain Different Types of Permissions**

In most educational studies, you need to obtain permissions from several individuals and groups before you can gather data. Permissions may be required from:

* Institutions or organizations (e.g., school district)
* Speciﬁc sites (e.g., the secondary school)
* A participant or group of participants
* Parents of participants (e.g., 10th graders’ parents)
* The campus on which you conduct the research (i.e., permission from youruniversity or college institutional review board)

Permission is often necessary before you can enter a site and collect data. This approval usually comes from leaders or persons of authority in organizations. Gainingpermissions from organizational personnel requires contacting them before the start of astudy and obtaining their permission to enter and to study their setting.

The best way to seek permission from the necessary individuals or groups is to askfor it formally in a letter. Include the purpose of the study, the amount of time you willbe at the site collecting data, the time required of participants, and how you will usethe data or results. Also, state the speciﬁc activities you will conduct, the beneﬁts to theorganization or individual because of the study, and the provisions you have made toprotect the anonymity of study participants. By providing this information, you will show a concern for the potential intrusion of the study into their workplaces and lives and set the stage for realistic expectations on their part.

**Obtain Informed Consent**

It is important to protect the privacy and conﬁdentiality of individuals who participate in the study. In contrast to early research in education and the social sciences, investigators today are sensitive to the potential harm that participants may experience because of research.

**Review Board Approval**

In the last 30 years, colleges and universities have required that researchers guarantee to participants that their research will cause minimal risk to participants. In turn, participants consent to participation in research.

In the 1970s, the federal government created legislation to monitor campusbased research because of human abuses in experiments (e.g., Nazi medical experiments, atomic bomb blast tests, and syphilis experiments on African Americans). This legislation mandated that colleges and universities create institutional review boards to approve studentand faculty research. An institutional review board is a committee made up of facultymembers who review and approve research so that the research protects the rights ofthe participants. The creation of these boards represents the one instance where research done on college and university campuses has been regulated (Howe & Dougherty, 1993).

**Process of Obtaining Approval from Review Boards**

Institutional review boards implement guidelines developed by the Federal Drug Administration based on three ethical principles: respect for persons (their consent, their right to privacy, and anonymity), beneﬁcence (weighing the beneﬁts of research versus the risks to individuals), and justice (equity for participation in a study). By following the guidelines, researchers guarantee that participants retain their autonomy and judge for themselves what risks are worth taking for the purposes of research (Howe & Dougherty, 1993).

To obtain approval from a campus institutional review board, you are required tosummarize the procedures in your research and supply evidence that your research procedures will offer certain protections to participants.

The exact process of gaining approval from an institutional review board varies from campus to campus. However, there are some basic steps that both student and faculty researchers complete when seeking approval. Understanding this process will help you evaluate the ethics of a published study and determine if you are proceeding ethically in your study.

1. Start by ﬁnding out about the review process used by the institutional review board on your campus. Identify individuals responsible for reviewing projects, locate theforms required for the review, and become familiar with the overall approval procedure. Campus review boards may have a brochure that describes this process.

2. Determine what information the review board needs about your project. The extent of the review and the concern of the institutional review board **will relate to two factors**. The ﬁrst is the level of risk that your participants will likely experience in the study (e.g., psychological, physical, emotional, legal, social, or economic). Is this risk less than minimal—no known risk? Is it minimal risks encountered in daily life? Is it greater than minimal—risks beyond those ordinarily encountered in daily life? The higher the risk, the more detailed your project description needs to be, andthe more closely the institutional review board will scrutinize your project.

The second factor that affects the extent of the review is whether you are studying a sensitive population considered to be of high risk. These populations include children under the age of 19, who need their own and their parents’ consent to participate; mentally incompetent participants, victims, or persons with neurological impairments; pregnant women or fetuses; prisoners; and individuals with AIDS. Also included in this category are studies involving conﬁdential records and/or pathoogical specimens and HIV testing.

If your study involves a sensitive population, your project will have at least minimal or greater than minimal risk (as opposed to no known risk), and the institutional review board will subsequently scrutinize it closely. Because many educational studies involve children under 19, these studies will require extensive review by the institutional review boards.

3. Develop an informed consent form for participants to sign before they participate in the study. Obtain written consent from participants even if your project poses minimal risk to the participants. An exception would be if the return of a questionnaire or instrument implies consent. An informed consent form is a statement that participants sign before they participate in research. This form should state that you will guarantee them certainrights, and that when they sign the form, they are agreeing to be involved in the study and acknowledge the protection of their rights.

**5.3 WHAT INFORMATION WILL YOU COLLECT?**

With the identiﬁcation of participants and a procedure for gaining permission, you next turn to the speciﬁc forms of data that will help you answer your research questions or address your research hypotheses. This step involves identifying the variables in yourquestions and hypotheses, ﬁnding deﬁnitions for these variables, and considering typesof information that will help you assess these variables, a process outlined in Figure 5 using the variable self efﬁcacy.

**Example**

**Flow of Activities**

**The Flow of Activities in Collecting Data**

**FIGURE 5**

Collect data on instruments yielding numeric scores

13 items on a selfefficacy attitude scale from

Bergin (1989)

Locate data (measures, observations, and documents with questions and scales)

Level of confidence that an individual can learn something by being taught by others

Operationally define the variable

Selfefficacy for learning from others

Identify the variable

Scores of each item ranged from 0 to 10, with 10 being “completely confident”

**Specify Variables from Research Questions and Hypotheses**

Research questions and hypotheses contain variables. To determine what data, need to be collected, you need to identify clearly the variables in your study. This will include independent, dependent, and control variables. A useful strategy is to make a list of the variables so that you can determine what variables are operating in a study.

**Operationally Define Each Variable**

Many deﬁnitions of variables are possible, such as a dictionary deﬁnition, but researchers use an operational deﬁnition. An operational definition is the speciﬁcation of how youwill deﬁne and measure the variable in your study. You can ﬁnd deﬁnitions in published research studies on your topic. Sometimes published studies have sections titled “Deﬁnition of Terms.” Alternatively, you might examine deﬁnitions in research summaries such as handbooks or encyclopedias. In some situations, a clear, applied deﬁnition suitable forﬁnding a measure is not available, and you will need to construct your own deﬁnition. Ifthis is the case, you should test it with other students or individuals knowledgeable aboutyour topic and variable before you use it in your research. A dictionary deﬁnition might be used as well, but remember that such a deﬁnition often reﬂects more common usage of a term rather than a research application.

Consider the variable weapon possession that one needs to deﬁne operationally. Write down two or three possible deﬁnitions for this variable, such as “a student who has been discovered carrying a knife to school.” What other deﬁnitions might you use that will help a researcher measure the extent to which high school students possess weapons at school? (Hint: Think about what happens when a teacher or administrator ﬁnds students with weapons in their possession.)

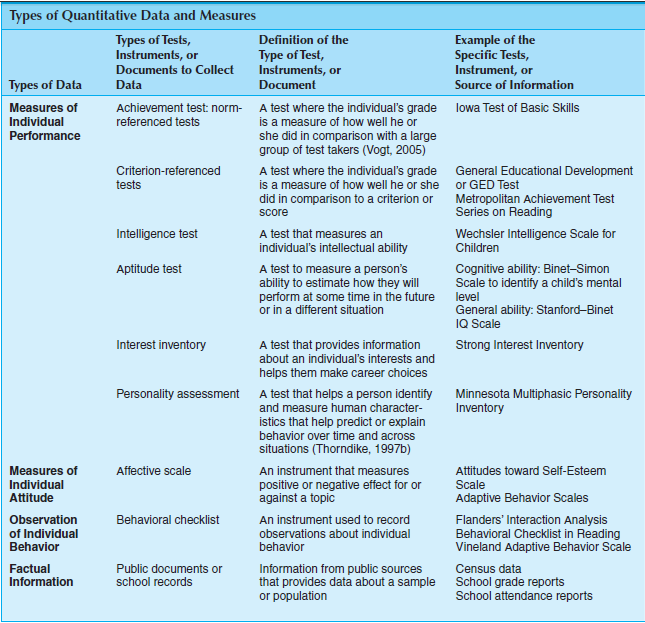
**Choose Types of Data and Measures**

With operational deﬁnitions for your variables, you next need to identify types of data that will measure your variables. Researchers collect data on instruments. An instrument is a tool for measuring, observing, or documenting quantitative data. Identiﬁedbefore the researchers collect data, the instrument may be a test, questionnaire, tallysheet, log, observational checklist, inventory, or assessment instrument. Researchers use instruments to measure achievement, assess individual ability, observe behavior, develop a psychological proﬁle of an individual, or interview a person. In quantitative research, four major types of information are gathered, as shown in Table 1. Deﬁnitions and examples in this table should help you apply your understanding of different forms of quantitative measures.

**Performance Measures**

You collect performance measures to assess an individual’s ability to perform on anachievement test, intelligence test, aptitude test, interest inventory, or personality assessment inventory. Participants take tests that measure their achievement (e.g., the Iowa Test of Basic Skills), their intelligence (e.g., Wechsler), or their aptitude (e.g., Stanford–Binet). In addition, you could gather data that measures an individual’s career interests or assesses personality traits. These measures are all available through instruments reported in the literature. Through past research, researchers have developed “norms” for these tests (conducted the tests with a number of individuals, averaged their scores, and looked at the differences in their scores) so that they can compare individual scores with typical scores for people who have taken the test. However, one drawback of performance data is that it does not measure individual attitudes, and performance datamay be costly, timeconsuming to gather, and potentially biased toward speciﬁc cultural groups.

Table 1



**Attitudinal Measures**

Alternatively, you can measure attitudes of individuals, a popular form of quantitative data for surveys, correlational studies, and experiments. Researchers use attitudinal measures when they measure feelings toward educational topics (e.g., assessing positive or negative attitudes toward giving students a choice of school to attend). To developattitudinal measures, researchers often write their own questions or they ﬁnd an instrument to use that measures the attitudes. Regardless of the approach, these measures need to contain unbiased questions (e.g., rather than “Should students carry weaponsto schools? ask, “How do you feel about students carrying weapons to school?”) and encourage participants to answer questions honestly. One drawback of attitudinal measures is that they do not provide direct evidence of speciﬁc behaviors (e.g., whether or not students actually carry a weapon to school).

**Behavioral Observations**

To collect data on speciﬁc behaviors, you can observe behavior and record scores on achecklist or scoring sheet. Behavioral observations are made by selecting an instrument (or using a behavioral protocol) on which to record a behavior, observing individuals for that behavior, and checking points on a scale that reﬂect the behavior (behavioralchecklists). The advantage of this form of data is that you can identify an individual’s actual behavior, rather than simply record his or her views or perceptions. However, behaviors may be difﬁcult to score, and gathering them is a timeconsuming form of datacollection. Further, if more than one observer gathers data for a study, you need to train observers to provide consistent procedures and periodically check that the observers apply consistent scoring.

An example of a behavioral checklist is the Measurement of Inappropriate and Disruptive Interactions (MIDI) developed and used in the SaberTooth Project, which studied physical education curriculum changes in one middle school and two comparison schools (Ward, 1999. The investigators used this checklist in a study of four classes in which the teachers provided an instructional unit on lacrosse to eighth grade students (Ward et al., 1999). During this classroom unit, the researchers observed the students and scored student behaviors using the MIDI scoring sheet in each class.

The legend for this scoring sheet, located at the bottom, lists the codes that observers recorded in each cell. These codes were the ﬁrst letter of the appropriate word used to describe the context or focus of the lesson in which the behavior occurs (i.e., game, practice, cognitive, instruction, or management/other). The observers also recorded the type of inappropriate behavior during the primary event that involved the most students during the interval (i.e., talking out/noise, inactive, offtask, noncompliance, verbal offense). Finally, observers indicated who was engaged in the disruption (i.e., class, small group, individual) to assess the extent of misbehavior in the class. Data were collected on site using this scoring sheet as the instrument, and three observers in the classes recorded their observations (identiﬁed by the column numbers) at an interval of 6second observations. The investigators trained the observers in their scoring procedures so that they would score the behavior consistently. An audiotape recording cued the observers as to when they would mark their observations on the checklist sheet.

After recording scores for all students, the observers analyzed the differences among students in their disruptive behaviors.

**Factual Information**

Quantitative, numeric data is also available in public educational records. Factual information or personal documents consist of numeric, individual data available in publicrecords. Examples of these types of data include grade reports, school attendance records, student demographic data, and census information. As long as these documents are available in the public domain, researchers can access and use them. Investigators cannot easily access some documents, such as health information about students, because federal regulations protect the privacy of individuals. Also, researchers need to scrutinize the public documents carefully to determine if they represent accurate data. The availability of public documents does not infer that researchers have collected the data carefully, with an eye toward accuracy.

**WebBased Electronic Data Collection**

With the use of Web sites and the Internet, electronic data collection in quantitative research is popular. At this time, use of Web sites and the Internet for data collection consists of administering surveys (Solomon, 2001), gathering interview data (Persichitte, Young, & Tharp, 1997), or using existing databases for analysis (e.g., Texas Lotto, U.S. Census Bureau, Louis Harris Pool; Pachnowski, Newman, & Jurczyk, 1997). Survey applications might consist of optically scanning an instrument and placing it on a Web site for participants to complete. Another form is computerassisted selfinterviewing (Babbie, 2003). In this approach, the participant in a study logs on to a computer, down loads a questionnaire from the Internet, completes the questionnaire, and sends the completed questionnaire back to the researcher. Other approaches using electronic ques tionnaires include voice recognition using the telephone keypad, and computerized self-administered questionnaires (Babbie, 2003). Electronic data collection provides an easy, quick form of data collection. However, use of the Internet may be limited because of

(a) limitations involving the use of listservs and obtaining of email addresses, (b) limitations of the technology itself, (c) lack of a population list, and (d) the questionable representativeness of the sample data (Mertler, 2001).

**How to Decide What Types to Choose**

Confronted by these many options for collecting quantitative data, which one or ones will you use? To select your data sources, ask yourself the following questions:

* What am I trying to learn about participants from my research questions and hypotheses? If you are trying to learn about individual behaviors of parents at a student–parent conference meeting, then you could use a behavioral checklist and record observations. If you are trying to measure the attitudes of teachers toward a bond issue, attitudinal questions or an attitudinal instrument will be required.
* What information can you realistically collect? Some types of data may not be collectible in a study because individuals are unwilling to supply it. For example, precise data on the frequency of substance abuse in middle schools may be difﬁcult to collect; identifying the number of student suspensions for substance abuse is much more realistic.
* How do the advantages of the data collection compare with its disadvantages? In our discussion of each data source, we have talked about the ideal situations for data collection. Given the ease or difﬁculty of collecting data, each type needs to be assessed.

How would you now advise that a researcher collect his data? Assume that he now seeks to answer the general quantitative research question “Why do students carry weapons in high school?” and the following subquestions:

a. “How frequently do students feel weapons are carried into high school?”

b. “What general attitudes do high school students hold toward the possession of weapons in the schools?”

c. “Does participation in extracurricular activities at school inﬂuence attitudes of stu dents toward possession of weapons?”

d. “Are student suspensions for possession of weapons on the increase in high schools?”

Before looking at the answers provided, list the type of information that a researcher might collect for subquestions a through d.

To answer these subquestions, he ﬁrst needs to locate or develop a questionnaire to send out to a sample of high school students in the school district. Her datacollection will consist mainly of attitudinal data. This questionnaire will measure student attitudes toward frequency of weapon possession (question a); assess student attitudes toward possession of weapons (question b); and gather factual data about the students (question c), such as age, level of education, race, gender, and extent of participation in extracurricular activities. To answer question , he will contact the school ofﬁcials of several high schools and ask if he can obtain reports on student suspensions—school documents that report quantitative data. In summary, he will collect both attitudinal and factual information.

**5.4 WHAT INSTRUMENT WILL YOU USE TO COLLECT DATA?**

Let’s assume that you will collect performance, attitudinal, or observational data. These forms of data collection all involve using an instrument. What instrument will you use to collect your data? Do you ﬁnd one to use or develop one yourself? If you search for one to use, how will you locate this instrument? Once you ﬁnd the instrument, what criteria will you use to determine if it is a good instrument to use?

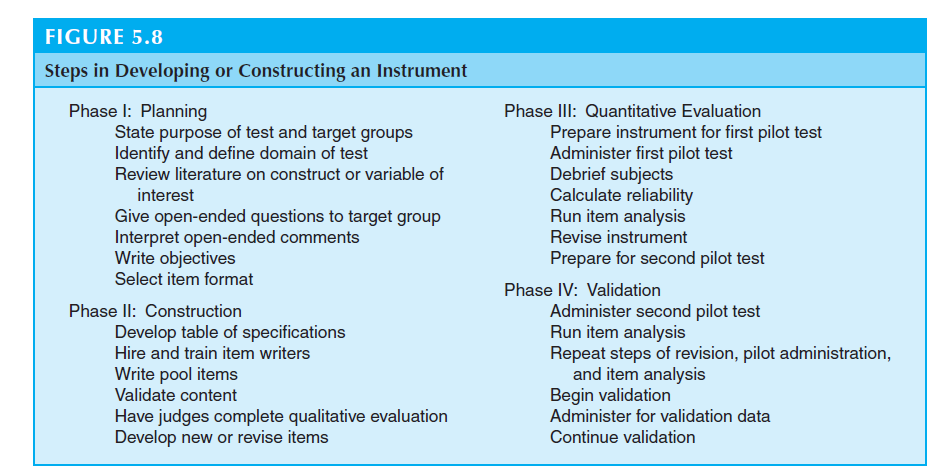
**Locate or Develop an Instrument**

Three options exist for obtaining an instrument to use: you can develop one yourself, locate one and modify it, or locate one and use it in its entirety. Of these choices, locating one to use (either modifying it or using it in its original form) represents the easiest approach. It is more difﬁcult to develop an instrument than to locate one and modify it for use in a study. Modifying an instrument means locating an existing instrument, obtaining permission to change it, and making changes in it to ﬁt your requirements. Typically, authors of the original instrument will ask for a copy of your modiﬁed version and the results from your study in exchange for your use of their instrument.

An instrument to measure the variables in your study may not be available in the literature or commercially. If this is the case, you will have to develop your own instru ment, which is a long and arduous process. Developing an instrument consists of several steps, such as identifying the purpose of the instrument, reviewing the literature, writ ing the questions, and testing the questions with individuals similar to those you plan to study. The four phases of development, recommended by Benson and Clark (1983) and shown in Figure 6, illustrate the rigorous steps of planning, constructing, evaluating, and checking to see if the questions work (i.e., validating an instrument). In this process, the basic steps consist of reviewing the literature, presenting general questions to a target group, constructing questions for the item pool, and pilot testing the items. The statistical procedures of calculating reliability and item analysis are available in computer software programs.

**Search for an Instrument**

If you decide to use an existing instrument, the publisher or author will typically charge you a fee for use of the instrument. Finding a good instrument that measures your inde pendent, dependent, and control variables is not easy. In fact, you may need to assemble a new instrument that consists of parts of existing instruments.



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Whether you search for one instrument or several to use, several strategies can aid in your search:

* Look in published journal articles. Often authors of journal articles will report instruments and provide a few sample items so that you can see the basic content included in the instrument. Examine references in published journal articles that cite speciﬁc instruments and contact the authors for inspection copies. Before you use the instrument, seek permission from the author. With limited space in journals, authors are including fewer examples of their items or copies of their instruments.
* Run an ERIC search. Use the term instruments and the topic of the study to search the ERIC system for instruments. Use the online search process of the ERIC data base. Use the same search procedure to locate abstracts to articles where the authors mention instruments that they have used in their studies.
* Examine guides to tests and instruments that are available commercially. Examine the Mental Measurements Yearbook (MMY; Impara & Plake, 1999) or the Tests in Print (TIP; Murphy, Impara, & Plake, 1999), both of which are available from the Buros Institute of Mental Measurements (www.unl.edu/buros/). More than 400 commercial ﬁrms develop instruments that are available for sale to individuals and institutions. Published since 1938, these guides contain extensive information about tests and measures available for educational research use. You can locate reviews and descriptions of Englishlanguage commercially published tests in the MMY, which is available on CDROM databases in many academic libraries.

**Criteria for Choosing a Good Instrument**

Once you ﬁnd an instrument, several criteria can be used to assess whether it is a good instrument to use. Ask yourself:

* Have authors developed the instrument recently, and can you obtain the most recent version? With knowledge expanding in educational research, instruments over 5 years old might be outdated. To stay current, authors update their instru ments periodically, and you need to ﬁnd the most recent copy of an instrument.
* Is the instrument widely cited by other authors? Frequent use by other researchers will provide some indication of its endorsement by others. Use by other research ers may provide some evidence about whether the questions on the instrument provide good and consistent measures.
* Are reviews available for the instrument? Look for published reviews about the instrument in the MMY or in journals such as Measurement and Evaluation in Counseling and Development. If reviews exist, it means that other researchers have taken the instrument seriously and seek to document its worth.
* Is there information about the reliability and validity of scores from past uses of the instrument?
* Does the procedure for recording data ﬁt the research questions/hypotheses in your study?
* Does the instrument contain accepted scales of measurement?

Because of the importance of the last three criteria—reliability and validity, recording information, and scales of measurement—a discussion will explore these ideas in more depth.

**Do the Instrument’s Data Recording Procedures Fit the Research Questions/Hypotheses?**

Returning to our question of criteria for assessing a good instrument to use, another cri terion was that instruments contain recording procedures that ﬁt the data you need to answer the research questions or hypotheses. Who records the data on the instruments or checklists? Data may be selfreported; that is, the participants provide the informa tion, such as on achievement tests or on attitudinal questionnaires. Alternatively, the researcher may record the data on forms by observing, interviewing, or collecting docu ments. Having participants supply the data is less timeconsuming for the researcher. However, when the researcher records the data, he or she becomes familiar with how the participants respond and hence can control for a higher level of quality of the data.

**Are Adequate Scales of Measurement Used?**

Another criterion is that the instrument should contain good response options to the questions. Variables can be measured as categories or on a continuous range of scores. Now it is helpful to assess instruments that you might use in research in terms of the adequacy of their scales of measurement. For example, for a study of student attitudes toward the use of wireless laptops in a college classroom, a researcher might ask the question “To what extent does the wireless laptop help you learn in the classroom?” The student might answer this question using a categorical scale such as the following:

* To a great extent
* Somewhat
* To a less extent

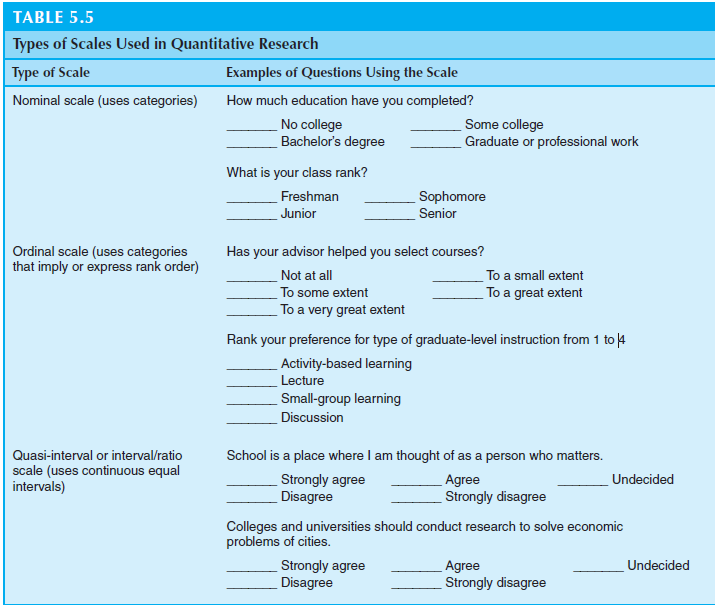
The easiest way to think about the types of scales of measurement is to remember that there are two basic types: categorical and continuous scales. Categorical scales have two types: nominal and ordinal scales. Continuous scales (often called scale scores in computer data analysis programs) also have two types: interval/quasiinterval and ratio scales. These types of scales are shown in Table 2.

Scales of measurement are response options to questions that measure (or observe) variables in categorical or continuous units. It is important to understand scales of measurement to assess the quality of an instrument and to determine the appropriate statistics to use in data analysis.

*Nominal Scales*

Researchers use nominal scales (or categorical scales) to provide response options where participants check one or more categories that describe their traits, attributes, or characteristics.

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These scales do not have any order. An example of a nominal scale would be gender, divided into the two categories of male and female (either one could be listed ﬁrst as a response option). Another form of a nominal scale would be a checklist of “yes” or “no” responses. A semantic differential scale, popular in psycho logical research, is another type of nominal scale. This scale consists of bipolar adjectives that the participant uses to check his or her position. For example, in a psychological study of talented teenagers, researchers were interested in studying the teenagers’ emo tional responses to their everyday activities (Csikszentmihalyi, Rathunde, Whalen, & Wong, 1993). The researchers used a semantic differential scale for teenagers to record their moodon several adjectives at certain times of the day. The researchers used a beeping device and the participants were asked to describe their mood as they were beeped.

Although the researchers summed scores of teenagers across several questions , the response scale to each question was nominal or categorical.

Ordinal Scales Researchers use ordinal scales (or ranking scales or categorical scales) to provide response options where participants rank from best or most important to worst or least important some trait, attribute, or characteristic. These scales have an implied intrinsic order. For example, a researcher might record individual performance in a race for each runner from ﬁrst to last place. Many attitudinal measures imply an ordinalscale because they ask participants to rank order the importance (“highly important” to “of no importance”) or the extent (“to a great extent” to “a little extent”) of topics. As this example illustrates, the information is categorical in a ranked order.

**5.5 HOW WILL YOU ADMINISTER THE DATA COLLECTION?**

The actual process of collecting data differs depending on the data and the instruments or documents you use. However, two aspects are standard across all forms of data and they deserve attention: the use of standard procedures and ethical practices.

**Standardization**

Performance measures, attitudinal measures, and observations rely on instruments. These instruments may consist of questionnaires that researchers mail to participants or hand out individually to people, surveys often administered in person or over the telephone, and observational checklists that researchers complete. Quantitative investigators also use instruments when they conduct facetoface interviews with individuals or for a group of individuals.

In all of these cases, it is important to use standard procedures. When procedures vary, you introduce bias into the study and the data for individuals may not be compa rable for analysis. Written procedures, as well as other data collectors assisting in the pro cess, help keep you on track. For interviewing using an instrument, you apply the same procedures to each individual. Instructions provided on the interview form will help ensure that you follow a standard process. If others help in interviewing, you will need to train them so that the procedures used by all interviewers are consistent. This training might involve a demonstration interview, followed by a trial interview and a critique of the trial so that all trainees follow the same procedures.

In collecting observational data, training must occur ﬁrst so that the researchers can collect data using standard procedures. A process similar to the one used in interviewing demonstration, trial run, and a critique might be used.

Researchers also collect public documents by obtaining permission to access this infor mation and then taking notes or recording the information in a computer ﬁle. Establishing a database of categories of information helps to organize this information. This organiza tion is especially important when you combine data from several sources into one ﬁle for analysis (e.g., enrollment data and suspension data for students in high schools).

**Ethical Issues**

Data collection should be ethical and it should respect individuals and sites. Obtaining permission before starting to collect data is not only a part of the informed consent process but is also an ethical practice. Protecting the anonymity of individuals by assigning numbers to returned instruments and keeping the identity of individuals conﬁdential offers privacy to participants. During data collection, you must view the data as conﬁdential and not share it with other participants or individuals outside of the project. You need to respect the wishesof individuals who choose not to participate in your study. Even when they consent to participate, people may back out or not show up for an observation or interview. Attempts to reschedule may be futile and you may need to select another person for data collection rather than force an individual to participate.

**Referenses**

1.  Fink, A. (2002). The survey handbook (2nd ed.) . Thousand Oaks, CA: Sage.

2. Fowler, W. J. (1995). School size and student outcomes. Advances in

Educational Productivity, 5, 3–36.

3. Cohen, D. K. ( 1988). Teaching practice: Plus ça change . . . InP. W. Jackson (Ed.), Contributing to educational change: Perspectives on research and practice (pp. 27–84). Berkeley, CA: McCutcheon.

4. Lipsey, M. W. (1990). Design sensitivity: Statistical power for experimental

research. Newbury Park, CA: Sage.

5. Lipsey, M. W. (1998). Design sensitivity: Statistical power for applied experimental research. In L. Bickman & D. J. Rog (Eds.), Handbook of applied social research methods (pp. 39–68). Thousand Oaks, CA: Sage.

6. Murphy, K. R., & Myors, B. (1998). Statistical power analysis: A simple and

general model for traditional and modern hypothesis tests. Mahwah, NJ: Erlbaum.

7. Murphy, L. L., Impara, J. C., & Plake, B. S. (Eds.). (1999). Tests in print V.

Lincoln: Buros Institute of Mental Measurements, University of Nebraska–Lincoln.

8.  Howe, K. R., & Dougherty, K. C. (1993). Ethics, institutional review boards, and the changing face of educational research. Educational Researcher, 22, 16–21.

9. Solomon, D. J. (2001). Conducting Webbased surveys. Practical Assessment, Research & Evaluation, 7(19), 1–6.

10. Jones, K., Gould, D., Brown, A., Young , J., & The Peabody Family School Partnership Lab of Vanderbilt University. ( 2000). “Sharing the dream” parent questionnaire. Retrieved from <http://www>. Vanderbilt.edu/Peabody/familyschool

10. Fink, A., & Kosekoff, J. (1985). How to conduct surveys: A stepbystep

guide. Newbury Park, CA: Sag.

**Lecture 6**

**Analyzing and Interpreting Quantitative Data**

**6.1 How do you prepare the data for analysis?**

**6.2 How do you analyze the data?**

**6.3 How do you report the results?**

**6.4 How do you interpret the results?**

Statistics can be challenging. However, calculating statistics is only one step in the process of analyzing data. Analysis also involves preparing your data for analysis, running the analysis, reporting results, and discussing them.

By the end of this chapter, you should be able to:

* Identify the steps in the process of analyzing and interpreting quantitative data.
* Describe the process of preparing your data for analysis.
* Identify the procedures for analyzing your data.
* Learn how to report the results of analyzing your data.
* Describe how to interpret the results

**WHAT ARE THE STEPS IN THE PROCESS OF QUANTITATIVE DATA ANALYSIS?**

There are several interrelated steps used in the process of analyzing quantitative data. The ﬁrst step is to prepare the data for analysis. This involves determining how to assign numeric scores to the data, assessing the types of scores to use, selecting a statistical program, and inputting the data into a program, and then cleaning up the database for analysis. The second step begins the data analysis. Typically you conduct a descriptive analysis of the data reporting measures of central tendency and variation. Then you conduct more sophisticated inferential analysis to test hypotheses and you examine conﬁdence intervals and effect sizes. The next step is to report the results that are found using tables, ﬁgures, and a discussion of the key results. Finally, you interpret the results from the data analysis. This consists of summarizing the results, comparing the results with past literature and theories, advancing the limitations of the study, and ending with suggestions for future research.

**6.1 HOW DO YOU PREPARE THE DATA FOR ANALYSIS?**

The ﬁrst step for you will be to organize data for analysis. Preparing and organizing data for analysis in quantitative research consists of scoring the data and creating a codebook, determining the types of scores to use, selecting a computer program, input ting the data into the program for analysis, and clearing the data.

**Score the Data**

When you collect data on an instrument or a checklist, you will need some system for scoring the data. Scoring data means that the researcher assigns a numeric score (or value) to each response category for each question on the instruments used to collect data.

For instance, assume that parents respond to a survey asking them to indicate their attitudes about choice of a school for children in the school district. One question might be:

Please check the appropriate response to this statement:

“Students should be given an opportunity to select a school of their choice.”

\_\_\_\_\_\_\_\_\_\_\_\_ Strongly agree

\_\_\_\_\_\_\_\_\_\_\_\_ Agree

\_\_\_\_\_\_\_\_\_\_\_\_ Undecided

\_\_\_\_\_\_\_\_\_\_\_\_ Disagree

\_\_\_\_\_\_\_\_\_\_\_\_ Strongly disagree

Assume that a parent checks “Agree.” What numeric score would you assign to the response so that you will assign the same score to each person who checks “Agree”? To analyze the data, you will need to assign scores to responses such as 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree, and 1 = strongly disagree. Based on these assigned numbers, the parent who checks “Agree” would receive a score of 4.

Several guidelines can help in assigning numbers to response options:

* For continuous scales (such as interval scales), you should consistently score each question in this scale using the same numbering system. In the above example, you should consistently score a scale such as “Strongly agree” to “Strongly disagree” as a “5” to a “1.”
* For categorical scales such as “What level do you teach? high school, middle school, elementary,” you can arbitrarily assign num bers that make sense, such as 3 = high school, 2 = middle school, and 1 = elementary. A good rule to follow, however, is that the more positive the response or the higher or more advanced the categories of information, the higher the assigned number.
* To make scoring easy, you can preassign numbers on the instrument to each response option, such as in this example:

Please respond to this question:

“Fourth graders should be tested for math proﬁciency.”

\_\_\_\_\_\_\_\_\_\_\_\_ (5) Strongly agree

\_\_\_\_\_\_\_\_\_\_\_\_ (4) Agree

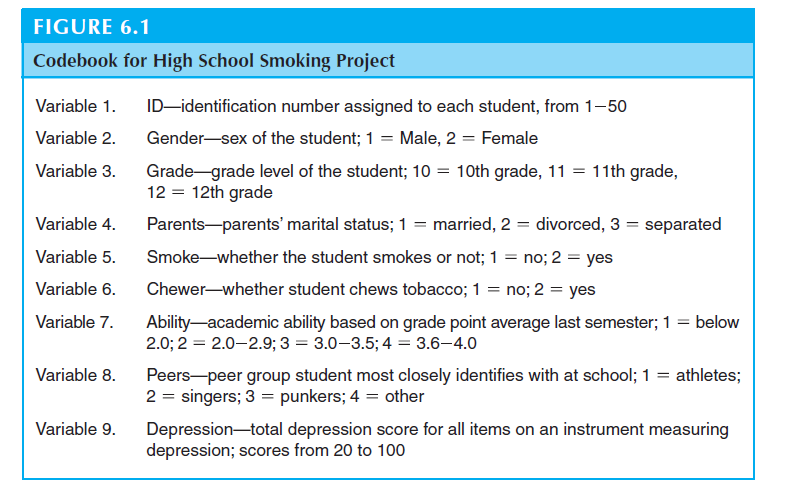
\_\_\_\_\_\_\_\_\_\_\_\_ (3) Undecided

\_\_\_\_\_\_\_\_\_\_\_\_ (2) Disagree

\_\_\_\_\_\_\_\_\_\_\_\_ (1) Strongly disagree

Here you can see that the numbers are already preassigned and you know how to score each response. Sometimes you can have participants ﬁll in circles forresponses on “bubble sheets” such as those used to aid in scoring when evaluating teachers in college classrooms. When students darken circles on these sheets, you can optically scan their responses for analysis. If you use a commercially available instrument, the company will often supply scoring manuals to describe how to score the instrument.

* One procedure that can aid you in assigning scores to responses is to create a codebook. A codebook is a list of variables or questions that indicates how the researcher will code or score responses from instruments or checklists. An example of a codebook is shown in Figure 7. Notice that each variable is given a name (i.e., Grade), a brief deﬁnition of the variable (i.e., grade level of the student) is given, and numbers are assigned to each response option (i.e., 10 = 10th grade, 11= 11th grade, 12 = 12th grade).

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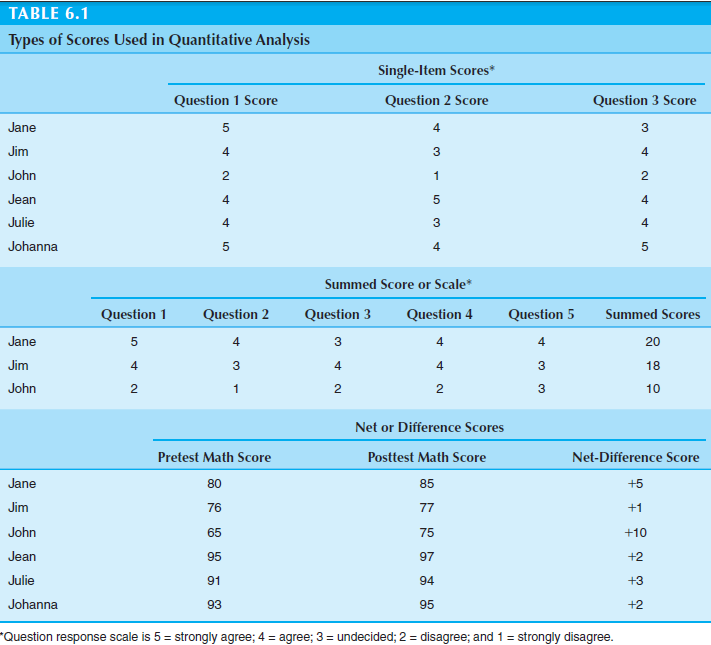
**Determine the Types of Scores to Analyze**

Look again at Figure7. Variable 9, Depression, consists of a score based on adding all items on an instrument. Before conducting an analysis of scores, researchers consider what types of scores to use from their instruments. This is important because the type of score will affect how you enter data into a computer ﬁle for analysis.

Table 3 presents three types of scores for six students: singleitem scores, summed scores on a scale, and net or difference scores.

**SingleItem Scores**

For a research study, you may wish to examine a singleitem score. A singleitem scoreis an individual score assigned to each question for each participant in your study. Thesescores provide a detailed analysis of each person’s response to each question on aninstrument.



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In one study, researchers asked individuals at a local school district meeting, “Will you vote yes or no for the tax levy in the election next Tuesday?” In scoring the data, the researcher would assign a value of 1 to a “no” response and a value of 2 to a “yes” response and have a record of how each individual responded to each question. In Table 3, all six participants have individual scores for questions 1, 2, and 3.

**Summed Scores**

In other cases, we may need to sum responses to all of the questions on the instrument, such as in the response scale scores of Table 3. This summing occurs because individualitems may not completely capture a participant’s perspective. Also, participants may misunderstand a single question or the author may have worded the question so that it biases results. In short, responses to single questions may not be reliable and may not accurately reﬂect an individual’s score. One solution to these problems is to form scales based on responses to single questions. Summed scores are the scores of an individual added overseveral questions that measure the same variable. Researchers add the individual items tocompute an overall score for a variable. As shown in Table 3, the three participants—Jane, Jim, and John—have provided responses to ﬁve questions. The researcher sums scores for each individual to provide a single score for a variable representing all ﬁve questions.

**Difference Scores**

Summed scores for individuals are used to develop an overall test score that can be compared from one time period to another. Net or difference scores are scores in aquantitative study that represent a difference or change for each individual. Some gainsmay be more meaningful than others. A small change in high scores may be more useful than a larger change in small scores. For example, the small gain in moving from 98 to 99 on a 100point scale may be more meaningful than the large change of going from 46 to 66 on the same scale. In experiments, researchers often gather scores on instru ments before the study begins (Time 1) and after it ends (Time 2). The researcher col lects these scores on pretests and posttests, which are typical measures collected during experimental research. In Table 3, for each of the 6 participants, we see a pretest math score, a summed score over all items on the test before a unit on math is taught. We also see for each participant a posttest math score, a summed score at the end of the unit that represents the overall score on a ﬁnal test. The net score shows how each participant’s performance improved, in all six cases, between the pre and posttest.

**Select a Statistical Program**

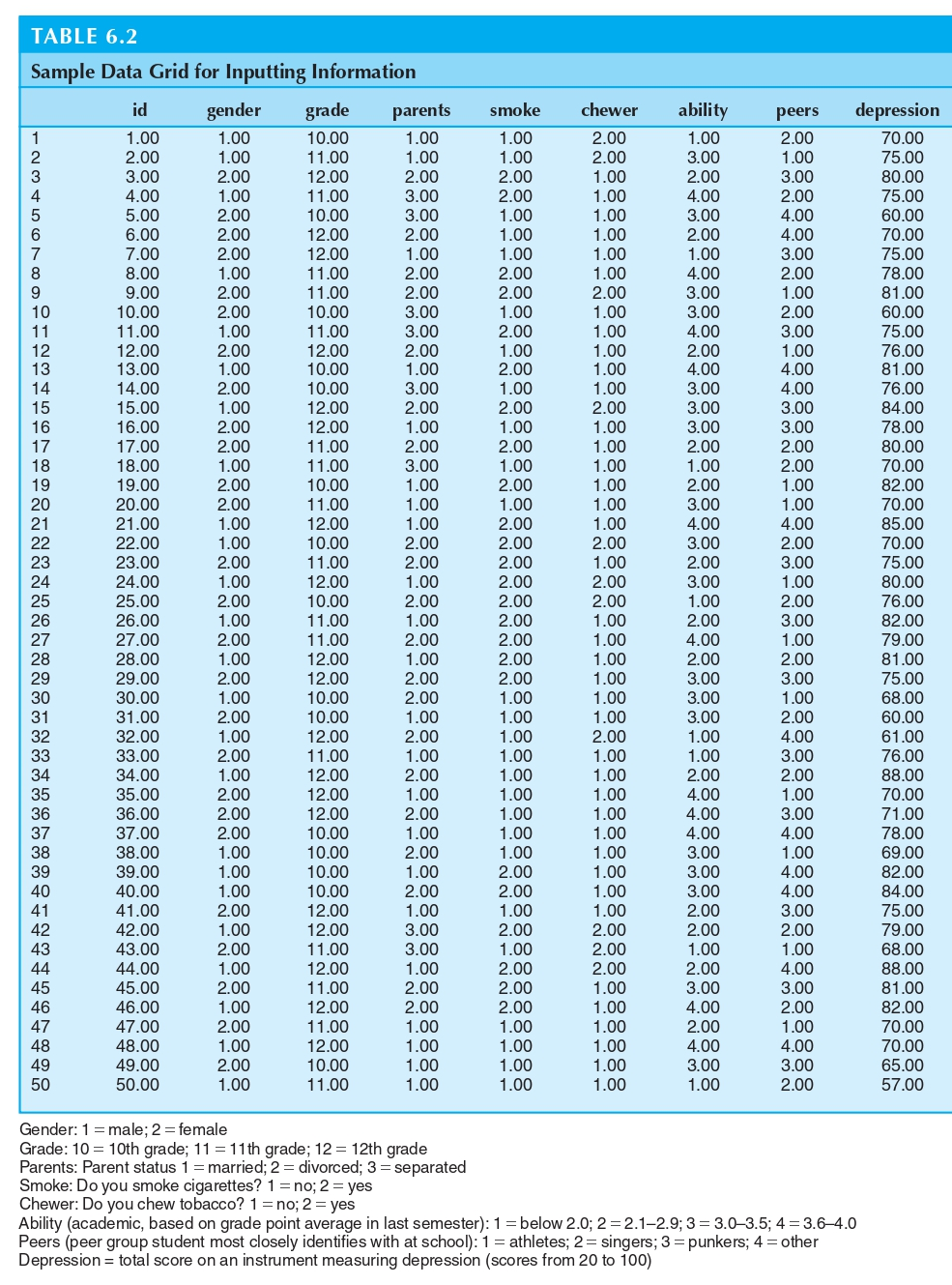
After scoring the data, researchers select a computer program to analyze their data. Academic researchers generally use statistical programs available as software programs fordesktops or laptops, or available on campus computers. The hardest part is deciding which software package to use. Here are some guidelines to follow when selecting a statistical program. (See Leedy & Ormrod, 2001, for additional suggestions.)

* Find a program with documentation about how to use the program. Programs oftenhave tutorials so that you can easily learn the key features and practice them usingsample data sets. Free tutorials are often available from Web sites.
* Ease of use is an important factor when selecting a program. Pulldown menus and easy data entry make a program easy to use.
* Look for a program that includes the types of statistics that you will use to answeryour research questions and hypotheses.
* Make sure that the program can analyze the amount of data in your database. Con sider how many participants and the maximum number of variables that you will need in your analysis. A program should adequately accommodate missing dataand provide some provisions for handling the situation where some data are missing for a participant. Look for a program that has ﬂexibility for data handling, canread data in many formats (e.g., numbers and letters), and can read ﬁles imported from spreadsheets or databases.
* Locate a program with the capability to output graphs and tables that you can use in your research reports.
* If you need to purchase the software program, weigh the costs of the various programs. Student versions of programs are available (although they may have limited statistical tests) at minimal cost.
* Select a program that your campus uses so that you can ﬁnd assistance to answerquestions when they arise. Some programs may provide technical support to helpanswer questions, but it may be timeconsuming and costly.

**Input Data**

After choosing a statistical program, your next step is to enter the data from your instruments or checklists into the computer program. Inputting the data occurs when theresearcher transfers the data from the responses on instruments to a computer ﬁle foranalysis. For those new to this process, this grid is similar to a spreadsheet table used in many popular software packages (e.g., Excel). Table 4 shows a small database for 50 high school students participating in a study on tobacco use in schools. You have already seen the variables in this database in the codebook presented in Figure 7.

**4**



A close inspection of Table 4 shows that the grid contains cells in rows and columns into which the researcher inputs data for analysis. You see displayed in the ﬁrst column the number of each participant followed by an ID number assigned to each of the 50 students. In the other columns are variables that the researcher is measuring (i.e., gender, grade, parents, and so forth). Using the codebook, the researcher assigns a number to each response that reﬂects a score on each variable. At the bottom of the sheet is coding information (found in the codebook) that provides an association between the numbers and the responses on the instrument. The names for the variables are short and simple but descriptive (no more than eight characters in SPSS, such as “gender,” “smoke,” or “chewer”).

The actual process of inputting data into this grid (George & Mallery, 2001) to create an SPSS database is as follows:

* Enter the data from scores on the instruments in the cells of the grid by selecting a cell and typing the appropriate value. Enter the data by rows for each individual and use the columns for the values of each variable. Values are the numbers assigned to response options for a variable (e.g., 1 = male, 2 = female).
* Assign an identiﬁcation number to each participant and place this number in the ﬁrst column or use the predetermined numbers assigned in column 1 by SPSS (i.e., 001, 002, 003, or 343, 344, 345). Your own numbers may reﬂect the last three digits in the individual’s social security number (e.g., 343, 344, 345) or some other identi fying number.
* In SPSS, you will see column heads listed as variables: var001, var002, var003, and so forth. Rather than use these headers, replace them with names of your variables (e.g., “var002” could be replaced by “gender”).
* You can also assign names to both values and variables so that your printout con tains these names and provides an easy way to identify your information. You can assign names to your variables, such as “parents,” as well as values for this variable, such as “married,” “divorced,” and “separated.”

**Clean and Account for Missing Data**

After entering data into the computer grid, you need to determine if there are errors in the data or missing data. Errors occur when participants in your study provide scores outside the range for variables or you input wrong numbers into the data grid. Missingdata may result when instrument data is lost, individuals skip questions, participants areabsent when you collect observational data, or individuals refuse to complete a sensitivequestion. For ethical reasons, you report how you handled missing data so that readerscan accurately interpret the results (George & Mallery, 2001). Because these problems may occur, you need to clean the data and decide how to treat missing data.

**Cleaning the Database**

Cleaning the data is the process of inspecting the data for scores (or values) that are outside the accepted range. One way to accomplish this is by visually inspecting the data grid.

For large databases, a frequency distribution (discussed shortly) will provide the range ofscores to detect responses outside of acceptable ranges. For example, participants may provide a “6” for a “strongly agree” to “strongly disagree” scale when there are only ﬁve response options. Alternatively, the researcher might type a score for a participant as “3” for gender, when the only legitimate values are “1” for females and “2” for males.

Another procedure is to use SPSS and have the program “sort cases” in ascending order for each variable. This process arranges the values of a variable from the smallest number to the largest, enabling you to easily spot outofrange or misnumbered cases. Whatever the procedure, a visual inspection of data helps to clean the data and free it from visible errors before you begin the data analysis.

**Assessing the Database for Missing Data**

You need to examine your database for missing data. Missing data will yield fewer individuals to be included in the data analysis, and because we want as many people included inthe analysis as possible, you need to correct as much as possible for missing data. Missing data are data missing in the database because participants do not supply it.

How should you handle missing data? The most obvious approach is to have a goodinstrument that individuals want to complete and are capable of answering so that missing data will not occur. In some research situations, you can contact individuals to determine why they did not respond. When individuals do not respond, something is wrong with your data collection, which may indicate faulty planning in your design.

You can expect, however, that questions will be omitted or some participants will not supply information, for whatever reason. In this case, you have a couple of options:

* You can eliminate participants with missing scores from the data analysis and include only those participants for which complete data exist. This practice, in effect, may severely reduce the number of overall participants for data analysis.
* You can substitute numbers for missing data in the database for individuals. When the variable is categorical, this means substituting a value, such as “9,” for all missing values in the data grid. When the variable is continuous (i.e., based on an interval scale), the process is more complex. Using SPSS, the researcher can have the computer program substitute a value for each missing score, such as an average number for the question for all study participants. You can substitute up to 15% of the missing data with scores without altering the overall statistical ﬁndings (George & Mallery, 2001). More advanced statistical procedures are also available for identi fying substitute numbers for missing data (see Gall, Borg, & Gall, 1996).

**6.2 HOW DO YOU ANALYZE THE DATA?**

After you prepare and organize the data, you are ready to analyze it. You analyze the data to address each one of your research questions or hypotheses. Questions or hypotheses in quantitative research require that you:

* Describe trends in the data to a single variable or question on your instrument (e.g., “What is the selfesteem of middle school students?”). To answer this question, we need Descriptive Statistics that indicate general tendencies in the data (mean, mode, median), the spread of scores (variance, standard deviation, and range), or a compari son of how one score relates to all others (z scores, percentile rank). We might seek to describe any of our variables: independent, dependent, control, or mediating.
* Compare two or more groups on the independent variable in terms of the dependent variable (e.g., “How do boys and girls compare in their selfesteem?”). To answer this question, we need inferential statistics in which we analyze data from a sample to draw conclusions about an unknown population. We assess whether the differences of groups (their means) or the relationship among variables is much greater or less than what we would expect for the total population, if we could study the entire population.
* Relate two or more variables (e.g., “Does selfesteem relate to an optimistic attitude?”). To answer this question, we also use inferential statistics.
* Test hypotheses about the differences in the groups or the relationships of variables (e.g., “Boys have higher selfesteem than girls” or “Selfesteem predicts an optimis tic attitude among middle school children”). To answer either of these questions, inferential statistics are also used.

Thus, we describe results to a single variable or question or we infer results from a sample to a population. In all quantitative research questions or hypotheses, we study individualssampled from a population. However, in descriptive questions, we study only a single vari able one at a time; in inferential analysis, we analyze multiple variables at the same time. Also from comparing groups or relating variables, we can make predictions about the vari ables. We can test hypotheses that make predictions comparing groups or relating variables.

**Conduct Descriptive Analysis**

How do we analyze the data to describe trends? You use statistics, the calculations ofvalues based on numbers. Many helpful books provide details about different statistics, their computation, and assumptions (e.g., Abelson, 1995; Gravetter & Wallnau, 2007; Wright, 1997). We focus here on the statistics typically used in educational research.

**Choosing a Descriptive Statistics Test**

Descriptive statistics will help you summarize the overall trends or tendencies in yourdata, provide an understanding of how varied your scores might be, and provide insightinto where one score stands in comparison with others. These three ideas are the central tendency, variability, and relative standing. Figure 8 portrays the statistical procedures that you can use to provide this information.

Analysis of Covariance

\* (i.v.) = independent variable

\*\*(d.v.) = dependent variable

Analysis of Variance

Biserial Correlation

Analysis

Wallis Test

Correlation Rho Coefficient Regression Kendall's

Coefficient Tau

Kruskall– Discriminant Point

Pearson Spearman *t*Test

ChiSquare Analysis

Phi Coefficient

Categorical (i.v.) Categorical (d.v.)

Continuous (i.v.) Categorical (d.v.)

Categorical (i.v.) Continuous (d.v.)

Standard deviation Percentile ranks Range

Continuous (i.v.)\* Continuous (d.v.)\*\*

*z* score

Variance

Mean Median Mode

Relative Standing

CentralTendency Variability

**Examples of the Family of Statistics in Educational Research**

**FIGURE 8**

Inferential Statistics

Descriptive Statistics

**6.3 HOW DO YOU REPORT THE RESULTS?**

When researchers conclude the statistical testing, they next turn to representing the results in tables and ﬁgures and reporting results in a discussion. You might include these results in a section labeled “Results.” Several points might aid in your construction of this section and help you understand the contents of a published results section.

This section should address or respond to each research question or hypothesis. A typical approach is to respond to each question or hypothesis one by one in the order in which they were introduced earlier in the study. In reporting the results, the researcheralso stays close to the statistical findings without drawing broader implications or meaning from them. Further, this section includes summaries of the data rather than the raw data (e.g., the actual scores for individuals). A results section includes:

* Tables that summarize statistical information
* Figures (charts, pictures, drawings) that portray variables and their relationships
* Detailed explanations about the statistical results

**Tables**

Researchers display data in tables that summarize statistical results to research questions or hypotheses. A table is a summary of quantitative data organized into rows and col umns . Typically, tables for reporting results contain quantitative information, but they might contain text information such as summaries of key studies found in the literature (and incorporated earlier in a study, before the results). One advantage of using tables is that they can summarize a large amount of data in a small amount of space. Below are some guidelines for creating tables.

* Although you can present multiple statistical tests in one table, a general guide line is to present one table for each statistical test. Sometimes, however, you can combine data from different statistical analyses into a single table. For example, all descriptive data to questions (M, SD, and range) can be combined into a single table. However, you should present each inferential test in an individual table.
* Readers should be able to grasp easily the meaning of a table. Tables should organize data into rows and columns with simple and clear headings. Also, the title for the table should accurately represent the information contained in the table and be as complete a description as possible.
* It is important to know the level of statistical detail for descriptive and inferential statistics to report in tables. An examination of tables in scholarly journals typically provides models to use for the level of detail required for each type of statistical test. In addition, the Publication Manual of the American Psychological Association (APA, 2010) provides examples of the level of detail to be reported in descriptive tables (e.g., M, SD, and N, or number of participants) and inferential tables (e.g., correlation, ANOVA, and regression). As an additional aid, you might view the typi cal output for statistical tests using SPSS (e.g., George & Mallery, 2001).
* Authors typically report notes that qualify, explain, or provide additional informa tion in the tables, which can be helpful to readers. Often, these notes include infor mation about the size of the sample reported in the study, the probability values used in hypothesis testing, and the actual signiﬁcance levels of the statistical test.

**Figures**

Discerning the difference between tables and ﬁgures is not always clear cut. A table includes a summary of quantitative data, whereas a ﬁgure presents information in graphs or in visual pictures (APA, 2010). Thus, a figure is a summary of quantitative information presented as a chart, graph, or picture that shows relations among scores or variables. Tables are preferred to ﬁgures (APA, 2010) because tables convey more information in a simple form.

Figures are suitable for visually presenting information in graphs and pictures in results sections of studies. The Publication Manual of the American Psychological Association (APA, 2010) suggests several standards for designing a good ﬁgure. A good ﬁgure:

* Augments, rather than duplicates, the text
* Conveys only essential facts
* Omits visually distracting detail
* Is easy to read and understand
* Is consistent with and is prepared in the same style as similar ﬁgures in the same article
* Is carefully planned and prepared

Various types of ﬁgures are found in educational research studies:

* Bar charts depict trends and distributions of data
* Scatterplots illustrate the comparison of two different scores and how the scores regress or differ from the mean. This information is useful for identifying outliers and upper or lower ceiling effects of scores.
* Line graphs display the interaction between two variables in an experiment.
* Charts portray the complex relationships among variables in correlational research designs.

The Publication Manual of the American Psychological Association (APA, 2010) provides illustrations of a line graph, a bar graph, a scatterplot, and a correlational chart path model. In all of these examples, the ﬁgure caption is placed at the bottom of the ﬁgure. This is different from table titles, which are placed at the top of the table.

**Present Results**

Although tables and ﬁgures summarize information from statistical tests, the researcher needs to describe in detail the results of the statistical tests. In a presentation of results, the researcher presents detailed information about the speciﬁc results of the descriptive and inferential statistical analyses. This process requires explaining the central results of each statistical test and presenting this information using language acceptable to quantitative researchers.

For the results to each statistical test, the investigator summarizes the ﬁndings in one or two sentences. These sentences should include sufﬁcient statistics to provide a com plete picture of the results. They should also include information necessary for reporting results to each statistical test. What represents “sufﬁcient” information depends on the speciﬁc type of test. At a minimum:

* Report whether the hypothesis test was signiﬁcant or not
* Provide important information about the statistical test, given the statistics
* Include language typically used in reporting statistical results

The information about the statistical test, for example, might include a report on degrees of freedom and sample size for the chisquare statistic, and means and standard deviations for descriptive statistics (APA, 2010).

Figure 6.5 shows examples of results statements for both descriptive and inferen tial statistics. For descriptive statistics, the means, standard deviations, and the range of scores show useful information about results. For inferential statistics, information such as the alpha level used, the actual p value, the critical region of rejection, the test statistic results, the degrees of freedom, and effect size should be reported. Conﬁdence intervals should also be reported (Wilkinson & Task Force on Statistical Inference, 1999).

**6.4 HOW DO YOU INTERPRET THE RESULTS?**

After reporting and explaining the detailed results, researchers conclude a study by summarizing key ﬁndings, developing explanations for results, suggesting limitations in the research, and making recommendations for future inquiries.

**Summarize the Major Results**

In the process of interpreting results, researchers ﬁrst summarize the major ﬁndings and present the broader implications of the research for distinct audiences. A summary is a statement that reviews the major conclusions to each of the research questions or hypoth eses. This summary is different from the results: It represents general, rather than speciﬁc, conclusions. Speciﬁc conclusions in the results would include detail about statistical tests, signiﬁcance levels, and effect sizes. General conclusions state overall whether the hypothesis was rejected or whether the research question was supported or not supported.

The research ends with statements by researchers about positive implications of the study. Implications are those suggestions for the importance of the study for differentaudiences. They elaborate on the signiﬁcance for audiences presented initially in the state ment of the problem. In effect, now that the study has been completed, the researcher is in a position to reﬂect (and remark) on the importance of the study.

**Explain Why the Results Occurred**

After this summary, researchers explain why their results turned out the way they did. Often this explanation is based on returning to predictions made from a theory or conceptual framework that guided the development of research questions or hypotheses. In addition, these explanations may include discussing the existing literature and indicating how the results either conﬁrmed or disconﬁrmed prior studies. Thus, you will frequently ﬁnd past research studies being presented by authors in this passage. A concluding passage may contrast and compare results with theories or bodies of literature.

**Advance Limitations**

Researchers also advance limitations or weaknesses of their study that may have affected the results. Limitations are potential weaknesses or problems with the study identiﬁed by the researcher. These weaknesses are enumerated one by one, and they often relate to inadequate measures of variables, loss or lack of participants, small sample sizes, errors in measurement, and other factors typically related to data collection and analysis. These limitations are useful to other potential researchers who may choose to conduct a similar or replication study. Advancing these limitations provides a useful bridge for recommending future studies. Limitations also help readers judge to what extent the ﬁndings can or cannot be generalized to other people and situations.

**Suggest Future Research**

Researchers next advance future research directions based on the results of the present study. Future research directions are suggestions made by the researcher about additional studies that need to be conducted based on the results of the present research. These suggestions are a natural link to the limitations of a study, and they provide use ful direction for new researchers and readers who are interested in exploring needed areas of inquiry or applying results to educational practice. These educators often need an “angle” to pursue to add to the existing knowledge, and future research suggestions, typically found at the conclusion of a research study, provide this direction. For those reading a study, future research directions highlight areas that are unknown and provide boundaries for using information from a speciﬁc study. Typically, good quantitative studies end with a positive note about the contributions of the research.

**References**

1. Leedy, P. D., & Ormrod, J. E. (2001). Practical research: Planning and

design (7th ed.). Upper Saddle River, NJ: Prentice Hall.

2. George, D., & Mallery, P. (2001). SPSS for Windows: Step by step. A simple guide and reference 10.0 update. Boston: Allyn & Bacon.

3. Gall, M. D., Borg, W. R., & Gall, J. P. (1996). Educational research (6th ed.).

White Plains, NY: Longman.

**Lecture 7**

**Collecting Qualitative Data**

**7.1 What are the different sampling approaches for selecting participants and sites?**

**7.2 What types of permissions will be required to gain access to participants and sites?**

**7.3 What type of qualitative data will you collect?**

**7.4 What procedures will be used to record data?**

**7.5 What field and ethical issues need to be anticipated?**

*Qualitative data collection* is more than simply deciding on whether you will observe or interview people. Five steps comprise the process of collecting qualitative data. You need to identify your participants and sites, gain access, determine the types of data to collect, develop data collection forms, and administer the process in an ethical manner

**7.1 What are the different sampling approaches for selecting participants and sites?**

In qualitative inquiry, the intent is not to generalize to a population, but to develop an indepth exploration of a central phenomenon. Thus, to best understand this phenomenon, the qualitative researcher purposefully or intentionally selects individuals and sites. This distinction between quantitative “random sampling” and qualitative “purposeful sampling” is portrayed in Figure7.1.

In quantitative research, the focus is on random sampling, selecting representativeindi viduals, and then generalizing from these individuals to a population. Often this process results in testing “theories” that explain the population. However, in qualitative research, you select people or sites that can best help you understand the central phenomenon. This understanding emerges through a detailed understanding of the people or site. It can lead to information that allows individuals to “learn” about the phenomenon, or to an under standing that provides voice to individuals whom not be heard otherwise.

Purposeful Sampling

The research term used for qualitative sampling is *purposeful sampling.* In **purposeful sampling**, researchers intentionally select individuals and sites to learn or understand the central phenomenon. The standard used in choosing participants and sites is whether they are “information rich” (Patton, 1990, p. 169). In any given qualitative study, you may decide to study a site (e.g., one college campus), several sites (three small liberal arts campuses), individuals or groups (freshman students), or some combination (two liberal arts campuses and several freshman students on those campuses). Purposeful sampling thus applies to both individuals andsites.

If you conduct your own study and use purposeful sampling, you need to identify your sampling strategy and be able to defend its use. The literature identiﬁes several qualitative sampling strategies (see Miles & Huberman, 1994; Patton, 1990). You have a choice of selecting from one to several sampling strategies that educators frequently use. These strategies are differentiated in terms of whether they are employed before data collection begins or after data collection has started (an approach consistent with a nemerging design). Further, each has a different intent, depending on.

In qualitative inquiry, the intent is not to generalize to a population, but to develop an in-depth exploration of a central phenomenon. Thus, to best understand this phenomenon, the qualitative researcher purposefully or intentionally selects individuals and sites. This distinction between quantitative “random sampling” and qualitative “purposeful sampling” is portrayed in Figure 9.

In quantitative research, the focus is on random sampling, selecting representativeindi viduals, and then generalizing from these individuals to a population. Often this process results in testing “theories” that explain the population. However, in qualitative research, you select people or sites that can best help you understand the central phenomenon. This understanding emerges through a detailed understanding of the people or site. It can lead to information that allows individuals to “learn” about the phenomenon, or to an under standing that provides voice to individuals whom not be heard otherwise.



**Difference between Random Sampling and Purposeful Sampling**

**FIGURE 9**

Select people or sites who can best help us understand our phenomenon

Select representative individuals

To develop a detailed understanding

To generalize from sample to the population

**Extreme Case Sampling**

Sometimes you are more interested in learning about a case that is particularly trouble some or enlightening, or a case that is noticeable for its success or failure (Patton, 1990). **Extreme case sampling** is a form of purposeful sampling in which you study an outlier case or one that displays extreme characteristics. Researchers identify these cases by locating persons or organizations that others have cited for achievements or distinguish ing characteristics (e.g., certain elementary schools targeted for federal assistance). An autistic education program in elementary education that has received awards may be an outstanding case to purposefullysample.

**Typical Sampling**

Some research questions address “What is normal?” or “What is typical?” **Typical sampling** is a form of purposeful sampling in which the researcher studies a person or site that is “typical” to those unfamiliar with the situation. What constitutes typical, of course, is open to interpretation. However, you might ask persons at a research site or even select a typical case by collecting demographic data or survey data about all cases. You could study a typical faculty member at a small liberal arts college because that individual has worked at the institution for 20 years and has embodied the cultural norms of the school.

**Theory or Concept Sampling**

You might select individuals or sites because they help you understand a concept or a theory. **Theory or concept sampling** is a purposeful sampling strategy in which the researcher samples individuals or sites because they can help the researcher generateor discover a theory or speciﬁc concepts within the theory. To use this method, you need a clear understanding of the concept or larger theory expected to emerge during the research. In a study of ﬁve sites that have experienced distance education, for example, you have chosen these sites because study of them can help generate a theory of student attitudes toward distance learning.

**7.2 What types of permissions will be required to gain access to participants and sites?**

Similar to quantitative research, gaining access to the site or individual(s) in qualitative inquiry involves obtaining permissions at different levels, such as the organization, the site, the individuals, and the campus institutional review boards. Of special importance is negotiating approval with campus review boards and locating individuals at a site who can facilitate the collection of qualitativedata.

Seek Institutional Review BoardApproval

Researchers applying for permission to study individuals in a qualitative project must go through the approval process of a campus institutional review board. These steps include seeking permission from the board, developing a description of the project, designing an informed consent form, and having the project reviewed. Because *qualitative* data collection consists of lengthy periods of gathering information directly involving people and recording detailed personal views from individuals, you will need to provide a detailed description of your procedures to the institutional review board. This detail is needed because the board may not be familiar with the qualitative approach to educational research and because you will spend time in people’s homes, workplaces, or sites in which you gather data.

Several strateg ies might prove useful when negotiating qualitative research through the institutional review boardprocess:

* Determine if individuals reviewing proposals on the review board are familiar with qualitative inquiry. Look for those individuals who have experience in conducting qualitative research. This requires a careful assessment of the membership of the reviewboard.
* Develop detailed descriptions of the procedures so that reviewers have a full dis closureofthepotentialriskstopeopleandsitesinthestudy.
* Detail ways you will protect the anonymity of participants. These might be masking names of individuals, assigning pseudonyms to individuals and their organizations, or choosing to withhold descriptors that would lead to the identiﬁcation of partici pants andsites.
* Discuss the need to respect the research site and to disturb or disrupt it as little as possible. When you gain permission to enter the site, you need to be respectful of property and refrain from introducing issues that may cause participants to question their group or organization. Doing this requires keeping a delicate balance between exploring a phenomenon in depth and respecting individuals and property at the researchsite.
* Detail how the study will provide opportunities to “giveback” or reciprocate in some way to those individuals you study (e.g., you might donate service satthe site, become an advocate for the needs of those studied, or share with them any monetary rewards you may receive from your study).
* Acknowledge that during your prolonged interaction with participants, you may adopt their beliefs and even become an advocate for their ideas.
* Specify potential power imbalances that may occur between yourself and the participants, and how your study will address these imbalances. For example, a power imbalance occurs when researchers study their own employers or employees in the workplace. If this is your situation, consider researching sites where you do not have an interest or try to collect data in a way that minimizes a power inequality between yourself and participants (e.g., observing rather than interviewing).
* Detail how much time you will spend at there search site. This detail might include the anticipated number of days, the length of each visit, and the times when visits will take place.
* Include in the project description a list of the interview questions so reviewers on the institutional board can determine how sensitive the questions may be. Typically, qualitative interview questions are open ended and general, lending supporttoanoninvasivestancebytheresearcher.

**7.3 What type of qualitative data will you collect?**

Another aspect of qualitative data collection is to identify the types of data that will address your research questions. Thus, it is important to become familiar with your questions and topics, and to review them prior to deciding upon the types of qualitative data that you will collect. Inqualitative research you pose general, broad questions to participants and allow them to share their views relatively unconstrained by your perspective. In addition, you collect multiple types of information, and you may add new forms of data during the study to answer your questions. Further, you engage in extensive data collection, spending a great deal of time at the site where people work, play, or engage in the phenomenon you wish to study. At the site, you will gather detailed information to establish the complexity of the central phenomenon.

We can see the varied nature of qualitative forms of data when they are placed into the followingcategories:

* Observations
* Interviews andquestionnaires
* Documents
* Audiovisualmaterials

Variations on data collection in all four areas are emerging continuously. Most recently, videotapes, student classroom portfolios, and the use of emails are attracting increasing attention as forms of data. Table 5 shows each category of data collection listed, the type of data it yields, and a deﬁnition for that type of data. Now let’s take a closer look at each of the four categories and their strengths and weaknesses.

Observations

When educators think about qualitative research, they often have in mind the process of collecting observational data in a speciﬁc school setting. Unquestionably, observations represent a frequently used form of data collection, with the researcher able to assume different roles in the process.

Observations

Gather fieldnotes by:

Conducting an observation as a participant Conducting an observation as an observer Spending more time as a participant than observer

Spending more time as an observer than a participant

First observing as an “outsider,” then participating in the setting and observing as an “insider”

Interviews and Questionnaires

Conduct an unstructured, openended interview and take interview notes.

Conduct an unstructured, openended interview; audiotape the interview and transcribe it. Conduct a semistructured interview; audiotape the interview and transcribe it.

Conduct focus group interviews; audiotape the interviews and transcribe them. Collect openended responses to an electronic interview or questionnaire.

Gather openended responses to questions on a questionnaire.

Documents

Keep a journal during the research study.

Have a participant keep a journal or diary during the research study. Collect personal letters from participants.

Analyze public documents (e.g., official memos, minutes of meetings, records or archival material).

Analyze school documents (e.g., attendance reports, retention rates, dropout rates, or discipline referrals).

Examine autobiographies and biographies. Collect or draw maps and seating charts.

Examine portfolios or less formal examples of students’ work. Collect emails or electronic data.

Audiovisual Materials

Examine physical trace evidence (e.g., footprints in the snow). Videotape a social situation of an individual or group.

Examine photographs or videotapes.

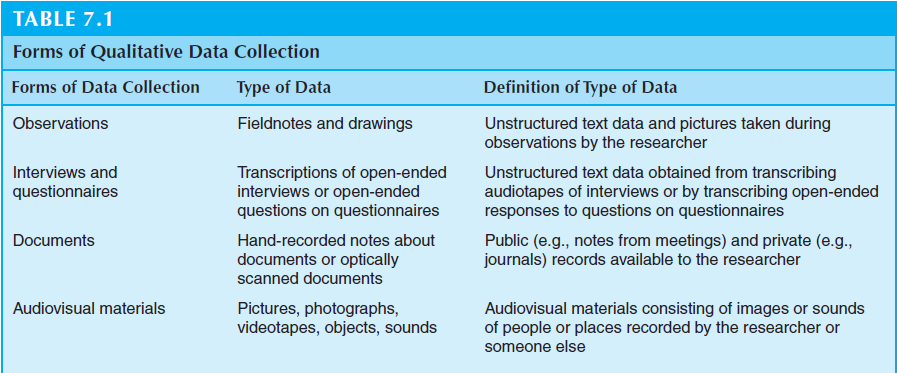
Collect sounds (e.g., musical sounds, a child’s laughter, or car horns honking). Examine possessions or ritual objects.

Have participants take photos or videotapes

A Compendium of Data Collection Approaches in Qualitative Research

**Observation** is the process of gathering openended, firsthand information by observing people and places at a research site. As a form of data collection, observation has both advantages and disadvantages. Advantages include the opportunity to record information as it occurs in a setting, to study actual behavior, and to study individuals who have difﬁculty verbalizing their ideas (e.g., preschool children). Some of the disadvantages of observations are that you will be limited to those sites and situations where you can gain access, and in those sites, you may have difﬁculty developing rapport with individu als. This can occur if the individuals are unaccustomed to formal research (e.g., a nonuni versity setting). Observing in a setting requires good listening skills and careful attention to visual detail. It also requires management of issues such as the potential deception by people being observed and the initial awkwardness of being an “outsider” without initial personal support in a setting (Hammersley & Atkinson, 1995).

**5**



**Observational Roles**

Despite these potential difﬁculties, observation continues to be a wellaccepted form of qualitative data collection. Using it requires that you adopt a particular role as an observer. No one role is suited for all situations; observational roles vary depending on your com fort at the site, your rapport with participants, and how best you can collect data to understand the central phenomenon. Although many roles exist (see Spradley, 1980), you might consider one of three popular roles.

**Role of a Participant Observer**

To truly learn about a situation, you can become involved in activities at the research site. This offers excellent opportunities to see experiences from the views of participants. A **participant observer** is an observational role adopted by researchers when they take part in activities in the setting they observe. As a participant, you assume the role of an “inside” observer who actually engages in activities at the study site. At the same time that you are participating in activities, you record information. This role requires seeking permission to participate in activities and assuming a comfortablerole as observer in the setting. It is difﬁcult to take notes while participating, and you may need to wait to write down observations until after you have left their search site.

**Role of a Non participant Observer**

In some situations, you may not be familiar enough with the site and people to participate in the activities. A nonparticipant observer is an observer who visits a site and records notes without becoming involved in the activities of the participants. The non participant observerisan “outsider” who sits on the periphery or some advantageous place (e.g., the back of the classroom) to watch and record the phenomenon under study. This role requires less access than the participant role, and gate keepers and individuals at are search site maybe more comfortable with it. However, by not actively participating, you will remove yourself from actual experiences, and theobservations you make may not be as concrete as if you had participated in the activities.

**Changing Observational Roles**

In many observational situations, it is advantageous to shift or change roles, making it difﬁcult to class if your role as strictly participat or participatory. A **changing observational role** is one where researchers adapt their role to the situation. For example, you might ﬁrst enter a site and observe as a non-participant, simply needing to “look around” in the early phases of research. Then you slowly become involved as a participant. Sometimes the reverse happens, and a participant becomes a non-participant. However, entering a site as a non-participant is a frequently used approach. After a short time, when rapport is developed, you switch to being a participant in the setting. Engaging in both roles permits you to be subjectively involved in the setting aswell as to see the setting more objectively.

Here is an illustration in which a researcher began as a nonparticipant and changed into a participant during the process of observing:

One researcher studying the use of wireless laptop computers in a multicultural education methods class spent the ﬁrst three visits to the class observing from the back row. He sought to learn the process involved in teaching the course, the instructor’s interaction with students, and the instructor’s overall approach to teaching. Then, on his fourth visit, students began using the laptop computers andthe observer became a participant by teaming with a student who used the laptop from her desk to interact with the instructor’s Web site.

**The Process of Observing**

As we just saw in the discussion of different observational roles, the qualitative inquirer engages in a process of observing, regardless of the role. This general process is outlined in the followingsteps:

1. *Select a site to be observed that can help you best understand the central phenom enon.* Obtain the required permissions needed to gain access to the site.

2. *Ease into the site slowly by looking around; getting a general sense of the site; and taking limited notes, at least initially.* Conduct brief observations at ﬁrst, because you will likely be overwhelmed with all of the activities taking place. This slow entry helps to build rapport with individuals at the site and helps you assimilate the large amount ofinformation.

3. *At the site, identify who or what to observe, when to observe, and how long to observe.* Gatekeepers can provide guidance as you make these decisions. The practical requirements of the situation, such as the length of a class period or the duration of the activity, will limit your participation.

4. *Determine, initially, your role as an observer.* Select from the roles of participant or nonparticipant during your ﬁrst few observations. Consider whether it would be advantageous to change roles during the process to learn best about theindividuals orsite. Regardless of whether you change roles, consider what role you will use and your reasons for it.

5. *Conduct multiple* observations over time to obtain the best understanding of the site and the individuals. Engage in broad observation at fi rst, noting the general landscapeof activities and events. As you become familiar with the setting, you can begin narrow your observations to speciﬁc aspects (e.g., a small group of children interact ing during reading time). A broadtonarrow perspective is a useful strategy because of the *Design some means for recording notes during an observation.* The data recorded during an observation are called *ﬁeldnotes.* **Fieldnotes** are text (words) recorded by the researcher during an observation in a qualitative study. In the example, the student observer engaged in participant observation when the instructor asked the class to spend 20 minutes observing an art object that had been brought into the classroom. This object was not familiar to the students in the class. It was from Indonesia and had a square, bamboo base and a horsehair top. It was probably used for some religious activities. This was a good object to use for an observational activity because it could not be easily recognized or described. The instructor asked students to observe the object and record ﬁeldnotes describing the object and reﬂecting on their insights, hunches, and themes that emerged during the observation amount of information available in an observation.

Interviews

Equally popular to observation in qualitative research is interviewing. A qualitative **interview** occurs when researchers ask one or more participants general, openended questions and record their answers. The researcher then transcribes and types the data into a computer ﬁle for analysis.

**FIGURE 10**

**An Observational Checklist**

Did you gain permission to study thesite?

Do you know your role as anobserver?

Do you have a means for recording fieldnotes, such as anobservational protocol?

Do you know what you will observefirst?

Will you enter and leave the site slowly, soas not to disturb thesetting?

Will you make multiple observationsover time?

Will you develop rapport with individualsat the site?

Will your observations change from broadto narrow?

Will you take limited notes atfirst?

Will you take both descriptive as wellas reflectivenotes?

Will you describe in complete sentences so that you have detailedfieldnotes?

Did you thank your participants at thesite?

In *qualitative* research, you ask **open-ended questions** so that the participants can best voice their experiences unconstrained by any perspectives of the researcher orpast research ﬁndings. An **open-ended response** to a question allows the participant to cre ate the options for responding. For example, in a qualitative interview of athletes in high schools, you migh task, “How do you balance participation in athletics with your school work?” The athlete then creates a response to this question without being forced into response possibilities. The researcher often audiotapes the conversation and transcribes the information into words for analysis.

Interviews in qualitative research have both advantages and disadvantages. Someadvantages are that they provide useful information when you cannot directly observeparticipants, and they permit participants to describe detailed personal information. Compared to the observer, the interviewer also has better control over the types of information received, because the interviewer can ask speciﬁc questions to elicit this information.

Some disadvantages are that interviews provide only information “ﬁltered” through the views of the interviewers (i.e., the researcher summarizes the participants’ views in the research report). Also, similar to observations, interview data may be deceptive and provide the perspective the interviewee wants the researcher to hear. Another disadvan tage is that the presence of the researcher may affect how the interviewee responds. Inter viewee responses also may not be articulate, perceptive, or clear. In addition, equipment issues may be a problem, and you need to organize recording and transcribing equipment (if used) in advance of the interview. Also, during the interview, you need to give some attention to the conversation with the participants. This attention may require saying little, handling emotional outbursts, and using icebreakers to encourage individuals to talk. With all of these issues to balance, it is little wonder inexperienced researchers express surprise about the difﬁculty of conducting interviews.

Open Ended Questionson Questionnaires Onquestionnaires, you may ask some questions that are closed ended and some that are open ended. The advantage of this type of questioning is that your predetermined closed-ended responses can net useful information to support theories and concepts in the literature. The open- ended responses, however, permit you to explore reasons for the closed-ended responses and identify any comments people might have that are beyond the responses to the closed-ended ques tions. The draw back of this approach is that you will have many responses Ыome short and some long to analyze. Also, the responses are detached from the context the setting in which people work, play, and interact. This means that the responses may not represent a fully developed database with rich detail as is often gathered in qualitative research. To analyze open-ended responses, qualitative researchers look for over lapping themes in the open-ended data and some researchers count the number of themes or the number of times that the participants mention the themes. Forexample, are searcher might ask a closed-ended question followed by an open-ended question:

Please tell me the extent of your agreement or disagreement with this statement: “Student policies governing binge drinking on campus should be more strict.”

Do you strongly agree?   Do you agree?

Are you undecided? Do you disagree?

Do you strongly disagree? Please explain your response in more detail.

In this example, the researcher started with a closed-ended question and ﬁve predetermined response categories and followed it with an open-ended question in which the participants indicate reasons for their responses.

**Conducting Interviews**

In all of the various forms of interviewing, several general steps are involved in conducting interviews or constructing open-ended questionnaires:

1. Identify the interviewees. Use one of the purposeful sampling strategies discussed earlier in this chapter
2. Determine the type of interview you will use. Choose the one that will allow you to best learn the participants’ views and answer each research question. Consider a telephone interview, a focus group interview, a one-on-one interview, an e-mail interview, a questionnaire, or some combination of these forms.
3. During the interview, audiotape the questions and responses. This will give you an accurate record of the conversation. Use adequate recording procedures, such as lapel microphone equipment (small microphones that are hooked onto a shirt or collar) for one-on-one interviewing, and a suitable directional microphone (one that picks up sounds in all directions) for focus group interviewing. Have an adequate tape recorder and telephone adapter for telephone interviews, and understand thoroughly mail programs for e-mail interviewing.
4. Take brief notes during the interview. Although it is sound practice to audiotape the interview, take notes in the event the tape recorder malfunctions. You record these notes on a form called an interview protocol, discussed later in this chapter. Recognize that notes taken during the interview may be incomplete because of the difﬁculty of asking questions and writing answers at the same time. An abbreviated form for writing notes (e.g., short phrases followed by a dash) may speed up the process.
5. Locate a quiet, suitable place for conducting the interview. If possible, interview at a location free from distractions and choose a physical setting that lends it to audiotaping. This means, for example, that a busy teachers’ or faculty lounge may not be the best place for interviewing because of the noise and the interruptions that may occur.
6. Obtain consent from the interviewee to participate in the study. Obtain consent by having interviewees complete an informed consent form when you ﬁrst arrive. Before starting the interview, convey to the participants the purpose of the study, the time the interview will take to complete, the plans for using the results from the interview, and the availability of a summary of the study when the research is completed.
7. Have a plan, but be ﬂexible. During the interview, stick with the questions, but be ﬂexible enough to follow the conversation of the interviewee. Complete the ques- tions within the time speciﬁed (if possible) to respect and be courteous of the participants. Recognize that a key to good interviewing is to be a good listener.
8. Use probes to obtain additional information. Probes are subquestions under each question that the researcher asks to elicit more information. Use them to clarify points or to have the interviewee expand on ideas. These probes vary from exploring the content in more depth (elaborating) to asking the interviewee to explain the answer in more detail (clarifying).

Be courteous and professional when the interview is over. Complete the interview by thanking the participant, assuring him or her of the conﬁdentiality. In all of the various forms of interviewing, several general steps are involved in conducting interviews or constructing open-ended questionnaires:

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9. Be courteous and professional when the interview is over. Complete the interview by thanking the participant, assuring him or her of the conﬁdentiality of the responses, and asking if he or she would like a summary of the results of the study.

**Documents**

A valuable source of information in qualitative research can be documents.

Documents consist of public and private records that qualitative researchers obtain about a site or participants in a study, and they can include newspapers, minutes of meetings, personal journals, and letters. These sources provide valuable information in helping researchers understand central phenomena in qualitative studies. They represent public and private documents. Examples of public documents are minutes from meetings, ofﬁcial memos, records in the public domain, and archival material in libraries. Private documents consist of personal journals and diaries, letters, personal notes, and jottings individuals write to themselves. Materials such as e-mail comments and Web site data illustrate both public and private documents, and they represent a growing data source for qualitative researchers.

Documents represent a good source for text (word) data for a qualitative study. They provide the advantage of being in the language and words of the participants, who have usually given thoughtful attention to them. They are also ready for analysis without the necessary transcription that is required with observational or interview data.

On the negative side, documents are sometimes difﬁcult to locate and obtain.

Infor- mation may not be available to the public. Information may be located in distant archives, requiring the researcher to travel, which takes time and can be expensive. Further, the documents may be incomplete, inauthentic, or inaccurate. For example, not all minutes from school board meetings are accurate, because board members may not review them for accuracy. In personal documents such as diaries or letters, the handwriting may be hard to read, making it difﬁcult to decip her the information.

**Collecting Documents**

With so much variation in the types of documents, there are many procedures for collecting them. Here are several useful guidelines for collecting documents in qualitative research:

1. Identify the types of documents that can provide useful information to answer your qualitative research questions.
2. Consider both public (e.g., school board minutes) and private documents (e.g., personal diaries) as sources of information for your research.
3. Once the documents are located, seek permission to use them from the appropriate individuals in charge of the materials.
4. If you ask participants to keep a journal, provide speciﬁc instructions about the procedure. These guidelines might include what topics and format to use, the length of journal entries, and the importance of writing their thoughts legibly.
5. Once you have permission to use documents, examine them for accuracy, completeness, and usefulness in answering the research questions in your study.
6. Record information from the documents. This process can take several forms, including taking notes about the documents or, if possible, optically scanning them so a text (or word) ﬁle is created for each document. You can easily scan newspaper stories (e.g., on speeches by presidential candidates) to form a qualitative text database.

Collecting personal documents can provide a researcher with a rich source of infor- mation. For example, consider a study that used journals prepared by several women:

An important source for learning about women in superintendent positions is for them to keep a personal journal or diary of their experiences. A researcher asked three women super intendents to keep a diary for 6 months and record their reactions to being a woman in their capacity of conducting ofﬁcial meetings comprised primarily of men.

* 1. **What procedures will be used to record data?**

An essential process in qualitative research is recording data (Loﬂand & Loﬂand, 1995). This process involves recording information through research protocols, administer- ing data collection so that you can anticipate potential problems in data collection, and bringing sensitivity to ethical issues that may affect the quality of the data.

**Using Protocols**

Asal ready discussed, for documents and visual materials, the process of recording information may be informal (taking notes) or formal (optically scanning the material to develop a complete computer text ﬁle). For observations and interviews, qualitative inquirers use specially designed protocols. Data recording protocols are forms designed and used by qualitative researchers to record information during observations and interviews.

**An Interview Protocol**

During interviewing, it is important to have some means for structuring the interview and taking careful notes. As already mentioned, audiotaping of interviews provides a detailed record of the interview. As a backup, you need to take notes during the interview and have the questions ready to be asked. An interview protocol serves the purpose of reminding you of the questions and it provides a means for recording notes. An inter- view protocol is a form designed by the researcher that contains instructions for the process of the interview, the questions to be asked, and space to take notes of responses from the interviewee.

Development and design of an interview protocol to best understand the designand appearance of this form, examine the qualitative interview protocol used during a study of the campus reaction to a gunman who threatened students in a classroom (Asmussen & Creswell, 1995

You might design into an interview protocol:

* It contains a header to record essential information about the interview, statements about the purpose of the study, a reminder that participants need to sign the consent form, and a suggestion to make preliminary tests of the recording equipment. Other information you might include in the header would be the organization or work afﬁliation of the interviewees; their educational background and position; the number of years they have been in the position; and the date, time, and location of the interview.
* Following this header are ﬁve brief open-ended questions that allow participants maximum ﬂexibility for responding to the questions. The ﬁrst question serves the purpose of an icebreaker (sometimes called the “grand tour” question), to relax the interviewees and motivate them to talk. This question should be easy to understand and cause the participant reﬂecton experiences that they can easily discuss

**Position of Interviewee:**

[Describe here the project, telling the interviewee about (a) the purpose of the study,

(b) the individuals and sources of data being collected, (c) what will be done with the data to protect the confidentiality of the interviewee, and (d) how long the interview will take.]

[Have the interviewee read and sign the consent form.] [Turn on the tape recorder and test it.]

**Questions:**

1. Please describe your role in the incident.

2. What has happened since the event that you have been involved in?

3. What has been the impact on the University community of this incident?

4. What larger ramifications, if any, exist from the incident?

5. Whom should we talk to to find out more about campus reaction to the incident?

Thank the individuals for their cooperation and participation in this interview. Assure them of the confidentiality of the responses and the potential for future interviews, such as “Please describe your role in the incident.” The ﬁnal question on this particular instrument helps the researcher locate additional people to study.

* The core questions, Questions 2 through 4, address major research

questions in the study. For those new to qualitative research, you might ask more than four questions, to help elicit more discussion from interviewees and move through awkward moments when no one is talking. However, the more questions you ask, the more you are examining what you seek to learn rather than learning from the participant. There is often a ﬁne line between your questions being too detailed or too general. A pilot test of them on a few participants can usually help you decide which ones touse.

* In addition to the ﬁve questions, you might use probes to encourage participants to clarify what they are saying and to urge them to elaborate on their ideas.
* You provide space between the questions so that the researcher can take short notes about comments made by interviewees. Your notes should be brief and you can develop an abbreviated form for stating them. The style for recording these notes varies from researcher to researcher.
* It is helpful for you to memorize the wording and the order of the questions to minimize losing eye contact. Provide appropriate ever bal transitions from one question to the next. Recognize that individuals do not always respond directly to the question you ask: when you ask Question 2, for example, they may jump ahead and respond to Question4.
* Closing comments remind you to thank the participants and assure them of the conﬁdentiality of the responses. This section may also include a note to ask the interviewees if they have any questions, and a reminder to discuss the use of the data and the dissemination of information from the study.

**An Observational Protocol**

You use an observational protocol to record information during an observation, just as in interviewing. This protocol applies to all of the observational roles mentioned earlier. An observational protocol is a form designed by the researcher before data collection that is used for taking ﬁeldnotes during an observation. On this form, researchers record a chronology of events, a detailed portrait of an individual or individuals, a picture or map of the setting, or verbatim quotes of individuals. As with interview protocols, the design and development of observational protocols will ensure that you have an organized means for recording and keeping observational ﬁeld notes.

Developmentand Design of an Observational Protocol You have already seen

a sample observational protocol. An observational protocol such as that one permits qualitative researchers to record information, they see at the observation site. This information is both a description of activities in the setting and a reﬂection about themes and personal insights noted during the observation.This sample protocol illustrates the components typically found on a recording form in an observation:

* The protocol contains a header where you record information about the time, place, setting, and your observational role.
* You write in two columns following the header. These columns divide the page for recording into two types of data: a description of activities and a reﬂection about themes, quotes, and personal experiences of the researcher.
* The exact nature of this description may vary. For example, you may include a description of the chronological order of events. This description is especially useful if the observer is examining a process or event. You may also describe the individuals, physical setting, events, and activities (Bogdan & Biklen, 1998). You may also sketch a picture of the site to facilitate remembering details of the setting for the ﬁnal written report.
* Reﬂective notes record your experiences as a researcher, such as your hunches about important results and insights or emerging themes for later analysis.
  1. **What field and ethical issues need to be anticipated?**

**Field Issues**

Prior to a study, anticipate potential issues that might arise during data collection. These issues include access to site problems, observations, interviews, document research, journals, and the use of audiovisual materials.

Access. Anticipate the amount of time it will take to recruit participants to your study and the difﬁculty of recruitment. Some useful strategies include providing a small ﬁnancial incentive for individuals to participate. Also, remind participants a day or two before data collection of the exact time and day you will observe orinter view them. Stage the data collection so that they will feel comfortable responding, and schedule it at a time that is most convenient to them. Be realistic about the amount of time the data collection will take, and convey this time to the participants.

* Observing. You need to know your observational role (e.g., participant, nonparticipant) and clearly convey this role to your participants. Try not to take in everything the ﬁrst time you observe; form general impressions ﬁrst and then narrow your scope of observation (i.e., funnel approach). Take time to record your notes immediately after you observe so that you do not forget important details (e.g., quotes).
* Interviews. Prepare your equipment adequately. Check the functioning of your equipment prior to your interview. During the actual interview, use icebreakers to open the conversation, keep your opinions to yourself, and be prepared to keep the interviewee on track. Interviewees may not answer each question in order, but make sure that they answer each of your questions. Schedule your time so that you cover all of the questions on your interview protocol. Recognize that transcribing audiotape recordings takes substantial time, and schedule for it in your research plan.
* Documents. Anticipate the amount of time that may be required to locate, obtain permission for, and secure both public and private documents for your research. Always maintain a critical eye toward the documents you obtain. Asmuchaspossible, check them out to make sure they are credible and accurate. If

you ask participants to keep a journal, provide clear instructions about the topics to be included in their journals. Recognize that younger children need more speciﬁc instructions than older children do. Ask participants to write as legibly as possible in their journals.

* Audiovisual materials. When you videotape, plan ahead to keep the room as quiet as possible, place the camera where it will be least obtrusive, and openly discuss with the participants whether they are comfortable being video taped. If you plan to collect photographs from participants, give clear instructions about what they need to photograph or the nature of the photographs you will be collecting from them. Similar to documents, if you collect artifacts, drawings, or relics, check their authenticityasause ful record for your qualitative research.

**Ethical Issues**

In gathering data for a qualitative project, a researcher seeks an in-depth description of a phenomenon. Participants may be asked to discuss private details of their life experiences over a period of time. This process requires a sufﬁcient level of trust based on a high level of participant disclosure. This discussion advances some ethical issues to be anticipated when conducting qualitative research, and also offers guidelines for conducting qualitative research. It begins with the identiﬁcation of some guidelines for ethical practices, and then reviews key issues likely to arise, such as informing participants of the purpose of the study, refraining from deceptive practices, sharing information with participants (including your role as a researcher), being respectful of the research site, reciprocity, using ethical interview practices, maintaining conﬁdentiality, and collaborating with participants.

Research methodologists and professional associations offer comprehensive but not exhaustive lists of ethical principles that may guide researchers in conducting ethical studies. Patton (2002) offered a checklist of general ethical issues to consider, such as reciprocity, assessment of risk, conﬁdentiality, informed consent, and data access and ownership. The criteria of the American Anthropological Association (see Glesne & Peshkin, 1992) reﬂect appropriate standards. For example, researchers need to protect the anonymity of the participants by assigning numbers or aliases to them to use in the process of analyzing and reporting data. In some qualitative studies, to protect the anonymity of participants, you may need to develop a composite picture of the group rather than focus on any single individual.

Further, to gain support from participants, you need to convey to participants that they are participating in a study and inform them of the purpose of the study. A researcher must also not engage in deception about the nature of the study. What if the study is on a sensitive topic, and the participants would not want to be involved if they were aware of the topic? This issue, disclosure of the purpose of the research, is widely discussed in cultural anthropology, and you can address it by presenting general infor- mation about the study rather than speciﬁc details.

Deception is also an issue in obser- vational research. Scholars and researchers

possess a variety of opinions, ranging from utter opposition to complete acceptance, about whether it is ethical to conduct covert observations (Patton, 2002). Professional associations and institutional review boards are cautious and skeptical about approving covert observations. Blatant examples of deceptive practices in the past serve as reminders of the importance of ethical guidelines. For example, Stanley Milgram conducted experiments in which he asked participants to apply a shock treatment (which was actually ﬁctitious) to other individuals to assess obedience to a higher authority. Researchers studied Massachusetts schoolchildren who were fed breakfast cereal laced with radioactive isotopes, and investigators tested new drug treatments on prisoners in Philadelphia (Patton, 2002). These are all instances in which deceptive practices were used, and today they would not be approved for research studies. Also, especially vulnerable populations (children, incarcerated individuals, people of color, those from lower socioeconomic classes, and those with limited education) represent high-risk populations and are carefully reviewed as participants by institutional review boards. The researchers’ quest for information should be tempered by proper ethical constraints aimed at protecting the participants.

Another issue likely to develop is when the participant shares information “off the record.” Although in most instances this information would be omitted from analysis, the issue becomes a problem if not disclosing this information would actually harm individu- als. For example, when a researcher studying incarcerated Native Americans learned about a potential breakout during one of the interviews, she concluded that it would be a breach of faith with the participant if she reported the matter, and she kept quiet. Fortunately, the breakout was not attempted.

Another ethical issue likely to arise is whether you should share your experiences with participants in an interview setting, such as when, during a study about adolescent smoking behavior with middle school children, a researcher admits his own struggles with smoking. Alternatively, researchers may “go native” and adopt practices of the individu- als they are studying—a problem if the study participants are engaging in risky or inap- propriate behavior. Along this same line, it may be necessary to clearly deﬁne your role as a researcher (not a therapist offering advice or a judge evaluating the circumstances) because of the deep personal relationships that can form through the qualitative research process (Patton, 2002). Boundaries may need to be established to deﬁne the research relationship for the investigator and the participants and to determine when or if the relationship will terminate when the project ends (Hatch, 2002). Dealing with contradic- tory information may be a problem as well. Hopefully, over time, repeated interviews or observations will provide insight about patterns and lead to ﬁndings that are less contra- dictory. Of course, reporting contradictory ﬁndings may reﬂect the situation as accurately as possible in some qualitative studies.

Issues likely to arise about the research site are whether you will disrupt the individuals or groups at the site (e.g., cause a gym class to run overtime because of observations).

Participant conﬁdentiality is of utmost importance. The traditions of research in place today remind us that the lives and experiences of participants should be told, but the indi- viduals from which the research was gleaned must be concealed. Or must their identities be kept private? A new wave of research is emerging in which the participants collaborate with researchers to tell their stories (Patton, 2002). In this research, participants may act as coresearchers who help create and approve of the accuracy of the research. In cases such as these, participants may also wish to use their own name instead of a pseudonym. If the participants choose to use their names and have carefully weighed the consequences, can the researcher (or institutional review board) require the coresearchers to conceal their identity? Thus, there are new ethical dilemmas arising that may contradict the ethical guidelines currently in place. Researchers must be vigilant in maintaining high ethical standards while making appropriate accommodations for the changing nature of research and their particular project.

**References**

1. Patton, M. Q. ( 2002). *Qualitative evaluation and research methods*

(3rd ed.). Newbury Park, CA: Sage.

2. Miles, M. B. , & Huberman , A. M. ( 1994). Qualitative data analysis. Thousand Oaks, CA: Sage.

3. Patton, M. Q. (1990). Qualitative evaluation and research methods (2nd ed.). Newbury Park, CA: Sage.

4. Patton, M. Q. (2002). Qualitative research and evaluation methods (3rd ed.). Thousand Oaks, CA: Sage.

5. Spradley, J. P. (1979). The ethnographic interview. Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.

6. Spradley, J. P. (1980). Participant observation. New York: Holt, Rinehart and Winston.

**Lecture 8**

**Analyzing and Interpreting Qualitative Data**

**8. What are the six steps in analyzing and interpreting qualitative data?**

**8.1 How do you prepare and organize the data for analysis?**

**8.2 How do you explore and code the data?**

**8.3 How do you use codes to build description and themes?**

**8.4 How do you represent and report findings?**

**8.5 How do you interpret findings?**

**8.6 How do you validate the accuracy of your findings?**

**8. What are the six steps in analyzing and interpreting qualitative data?**

Maria has proceeded through the six steps commonly used in analyzing qualitative data. These steps are not always taken in sequence, but they represent preparing and organ izing the data for analysis; engaging in an initial exploration of the data through the process of coding it; using the codes to develop a more general picture of the data— descriptions and themes; representing the ﬁndings through narratives and visuals; mak ing an interpretation of the meaning of the results by reﬂecting personally on the impact of the ﬁndings and on the literature that might inform the ﬁndings; and ﬁnally, conduct ing strategies to validate the accuracy of the ﬁndings.

* It is inductive in form, going from the particular or the detailed data (e.g., transcrip tions or typed notes from interviews) to the general codes and themes. Keeping this in mind helps you understand how qualitative researchers produce broad themes or categories from diverse detailed databases. Although the initial analysis consists of subdividing the data (later we will discuss *coding* the data), the ﬁnal goal is to generate a larger, consolidated picture (Tesch,1990).
* It involves a simultaneous process of analyzing while you are also collecting data. In qualitative research, the data collection and analysis (and perhaps the report writing) are simultaneous activities. When you are collecting data, you may also be analyzing other information previously collected, looking for major ideas. This pro cedure differs from traditional approaches in *quantitative* research, in which data collection occurs ﬁrst, followed by dataanalysis.
* The phases are also iterative, meaning you cycle back and forth between data col lection and analysis. In qualitative research, you might collect stories from individuals and return for more information to ﬁll in gaps in their stories as your analysis of their storiesproceeds.
* Qualitative researchers analyze their data by reading it several times and conduct ing an analysis each time. Each time you read your database, you developadeeperunderstanding about the information supplied by yourparticipants.
* There is no single, accepted approach to analyzing qualitative data, although several guidelines exist for this process (see Dey, 1993; Miles & Huberman, 1994). It is an eclecticprocess.
* Qualitative research is “interpretive” research, in which you make a personal assessment as to a description that ﬁts the situation or themes that capture the major categories of information. The interpretation that you make of a transcript, for example, differs from the interpretation that someone else makes. This does not mean that your interpretation is better or more accurate; it simply means that you bringyourownperspectivetoyourinterpretation.

**8.1 How do you prepare and organize the data for analysis?**

Initial preparation of the data for analysis requires organizing the vast amount of information, transferring it from spoken or written words to a typed ﬁle and making decisions about whether to analyze the data by hand or by computer.

Organize Data

At an early stage in qualitative analysis, you organize data into ﬁle folders or computer ﬁles. Organization of data is critical in qualitative research because of the large amount of infor mation gathered during a study. The extensive data that an interview yields often surprises new researchers. For example, a 30minute interview will often result in about 20 pages of singlespaced transcription. With this sizable amount of data, the transcribing and organizing of information requires a system of organization, which could take several forms, such as:

* Developing a matrix or a table of sources that can be used to help organize the material
* Organizing the materials by type: all interviews, all observations, all documents, and all photographs or other visual materials; as analternative, you might consider organizing the materials by participant, site, location, or some combination of these approaches
* Keeping duplicate copies of all forms of data

Transcribe Data

During qualitative data collection, you will collect text or words through interviewing participants or by writing ﬁeldnotes during observations. This necessitates a need to con vert these words to a computer document for analysis. Alternatively, you might listen to the tapes or read your ﬁeldnotes to begin the process of analysis. When time is short or funds are scarce, you may be able to have only a few interviews or a few observational notes transcribed. The most complete procedure, however, is to have all interviews and all observational notes transcribed. As a general rule of thumb, it takes approximately 4 hours to transcribe 1 hour of tape (Dana Miller, personal communication, April 11, 2000). Hence, the process of transcription is labor intensive and you will need to allow adequate time forit.

**Transcription** is the process of converting audiotape recordings or ﬁeldnotes into text data. You may use a transcriptionist to type your text ﬁles or you can transcribe the information yourself. In either case, for interview data, transcriptionists need special equipment to help create the transcript. This equipment consists of a machine that enables the transcriber to start and stop tape recordings or to play them at a speed so that the transcriber can easily follow them. Here are a few more guidelines to facilitate transcription:

* Create2-inch margins on each side of the text document so that you can jot down notes in the margins during data analysis.
* Leave extra space on the page between the interviewer’s comments and the interviewee’s comments. This enables you to distinguish clearly between speakers during data analysis.
* Highlight or mark in some way the questions asked by the interviewer. You will not analyze your questions, but identifying them clearly indicates where one question ends and another begins. Often, you will analyze all answers to a single question.
* Use complete, detailed headers that contain information about the interview or observational session. Examine interview and observational protocols to see the type of content to be included in a transcription.
* Use complete, detailed headers that contain information about the interview or observational session. Examine interview and observational protocols to see the typeofcontenttobeincludedinatranscription.

Transcribe all words, and type the word “[*pause*]” to indicate when interviewees take a lengthy break in their comments. These pauses may provide useful informa tion about times when interviewees cannot or will not respond to a question. You can also record other actions occurring during an interview. For example, type “[*laughter* ]” when the interviewee laughs, “[*telephone rings*]” to indicate a phone call that interrupts the interview, or “[*inaudible*]” to mark when the transcriptionist cannot determine what is being said. As a general approach, transcribing all words willprovidedatathatcapturesthedetailsofaninterview.

Analyze by Hand or Computer

With the popularity of computers, researchers have a choice about whether to hand analyze data or to use a computer. The hand analysis of qualitative data means that researchers read the data, mark it by hand, and divide it into parts.

Traditionally, analyzing text data involves using color coding to mark parts of the text or cutting and pasting text sentences onto cards. Some qualitative researchers like to hand analyze all of their data. A hand analysis may be preferred when you:

• Are analyzing a small database (e.g., fewer than 500 pages of transcripts or ﬁeld-notes) and can easily keep track of ﬁles and locate text passages

• Are not comfortable using computers or have not learned a qualitative computer software program

• Want to be close to the data and have a hands-on feel for it without the intrusion of a machine

• Have time to commit to a hand analysis, since it is a labor-intensive activity to manually sort, organize, and locate words in a text data base

For others with a greater interest in technology and with the time to learn a computer program, a computer analysis is ideal. A computer analysis of qualitative data means that researchers use a qualitative computer program to facilitate the process of storing, analyzing, sorting, and representing or visualizing the data.

With the development of these computer programs, you have a choice as to whether to use hand coding or a computer analysis. You might base your decisionon several factors. Use a computer program when you:

• Are analyzing a large database (e.g., more than 500 pages of transcripts or ﬁeld- notes) and need to organize and keep track of extensive information;

• Are adequately trained in using the program and are comfortable using computers;

• Have resources to purchase a program or can locate one to use

• Need a close inspection of every word and sentence to capture speciﬁc quotes or meanings of passages.

8.2 How do you represent and report findings?

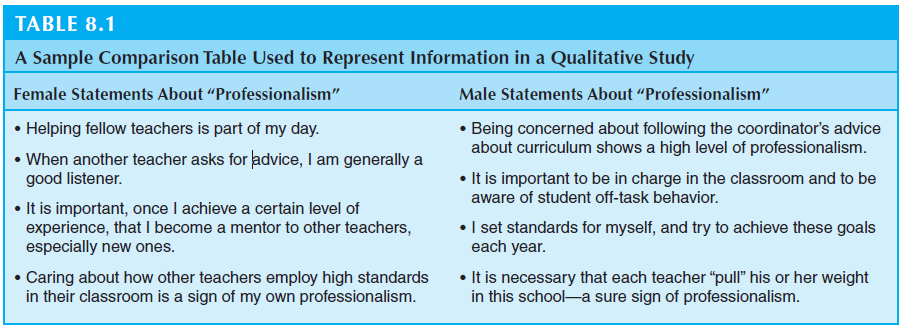
Representing Findings

Qualitative researchers often display their ﬁndings visually (Miles & Huberman, 1994) by using ﬁgures or pictures that augment the discussion. Different ways to display data are listed here:

 Create a comparison table. Create a visual image of the information in the form of a comparison table (see Spradley, 1980) or a matrix, a table that compares groups on one of the themes (e.g., men and women in terms of “safety”; see Miles & Huberman, 1994, for additional examples). In a qualitative study of the mean ing of “professionalism,” a researcher collected statements from both women and men teachers in a school. Statements from these teachers, shown in Table 6, are included in a comparison table to show that females and males can differ in their approaches to professionalism.

TABLE 6

A Sample Comparison Table Used to Represent Information in a Qualitative Study



 Develop a hierarchical tree diagram. This diagram visually represents themes and their interconnections so that the themes are presented in order from the broad themes to the narrow themes.

 Present ﬁgures. Figures with boxes show the connections among themes (see again Figure 8.9 from the grounded theory study by Creswell&Brown,1992).

 Draw a map. Depict the physical layout of the setting. As shown in Figure 8.10, Miller, Creswell, and Olander (1998) displayed the physical setting of a soup kitchen in their study. The authors provided this diagram so that readers could visualize where different activities happened.

 Develop a demographic table. Describe personal or demographic information for each person or site in the research. In a study of the types of technology used by instructors in college classrooms, the researcher described each instructor and his or her primary delivery style in a demographic table, shown in Table 7. The six individuals studied in this qualitative study displayed different personal characteristics as well as diverse approaches to using technology. This table provides readers with various demographic information for each instructor, such as number of years teaching, gender, class level of instruction, instructional approach used in the class, and his or her primary form of technology use.

 Reporting Findings

 The primary form for representing and reporting ﬁndings in qualitative research is a narrative discussion. A narrative discussion is a written passage in a qualitative study in which authors summarize, in detail, the ﬁndings from their data analysis. There is no set form for this narrative, which can vary widely from one study to another.

 Consider also the narrative elements that go into a report of your ﬁndings. As you make multiple passes through your database, looking for description and themes, consider these useful hints:

Include dialogue that provides support for themes. For example, in a study about reading disabilities of four middle school students, Kos (1991) provided this dialogue about the theme “reading-related stress” for a student named Karen. (Kos’s comments are labeled “R”; Karen’s comments are labeled “K.”)

K: I feel that it’s very difﬁcult for me. R: Mm hmm.

K: And sometimes I can read a book and some books are kind of difﬁcult.

And um, my mom said that you have to read or . . . you won’t get nowhere.

R: What do you think about that?

TABLE 7

A Sample Demographic Table in a Qualitative Study



**7**

8.3 How do you interpret findings?

Interpretation involves making sense of the data, or the “lessons learned,” as described by Lincoln and Guba (1985). Interpretation in qualitative research means that the researcher steps back and forms some larger meaning about the phenomenon based on personal views, comparisons with past studies, or both. Qualitative research is inter- pretive research, and you will need to make sense of the ﬁndings. You will ﬁnd this interpretation in a ﬁnal section of a study under headings such as “Discussion,” “Conclusions,” “Interpretations,” or “Implications.” This section includes:

 Are view of the major ﬁndings and how the research questions were answered

 Personal reﬂections of the researcher about the meaning of the data

 Personal views compared or contrasted with the literature

 Limitations of the study

 Suggestions for future research

• Summarize Findings

• A typical “Discussion” section begins with a general recap of the major ﬁndings. Sometimes you will state each individual research question again and provide ﬁndings for each question. The overall intent of this passage is to provide readers with an overview of the ﬁndings to complement the more detailed results in the description and theme passages.

• Convey Personal Reflections

• Because qualitative researchers believe that your personal views can never be kept separate from interpretations, personal reﬂections about the meaning of the data are included in the research study. You base these personal interpretations on hunches, insights, and intuition. Because you may have been to the ﬁeld and visited personally at great length with individuals, you are in a good position to reﬂect and remark on the larger meaning of the data. The two examples that follow illustrate the diversity of personal reﬂections found in qualitative studies.

• In the classic ethnography of the “sneaky kid,” Wolcott (1983) reﬂected about the meaning of learning for Brad:

• Learning in the broad enculturatived sense of coming to understand what one needs to know to be competent in the roles one may expect to fulﬁll in society, rather than in the narrow sense of learning-done-at-school—is an ongoing process in which each human engages through out a lifetime.

• The next example shows how researchers can offer interpretative commentary about new questions that need to be answered. In the discussion by Tierney (1993), who spoke with a 40-year-old African American on a university campus who had AIDS, the researcher left the interview with unanswered questions:

• How do we create understandings across differences so that we are able to acknowledge and honor one another, rather than bring into question one another’s legitimacy? It is incumbent on me as the author, then, to present these voices as fully and carefully as possible; at the same time, it is necessary for the reader or methodologist or administrator who does not understand these realities to try to come to terms with them.

• Make Comparisons to the Literature

• Interpretation may also contain references to the literature and past studies. Similar to quantitative research, the qualitative inquirer interprets the data in view of this past research, showing how the ﬁndings may support or contradict prior studies, or both. This interpretation may compare qualitative ﬁndings with reported views of a social science concept found in the literature, or it may combine personal views with an educational or social science term or idea. In a qualitative study of sibling interaction between a young man with Down syndrome and his three brothers, the authors Harry, Day, and Quist (1998) concluded with interpretive comments about the inclusion of “Raul” in situations outside of the family setting. They relate their own views to those in the literature:

• We strongly believe, as does much literature on the topic (Hurley-Geffner, 1995; Schnorr, 1990), that the ﬁrst requirement must be an inclusive and continuous school structure that keeps students with disabilities with their community and family peers from elementary school right through high school.

• Offer Limitations and Suggestions for Future Research

• Also similar to quantitative research, the qualitative researcher suggests possible limi- tations or weaknesses of the study and makes recommendations for future research. These limitations may address problems in data collection, unanswered questions by par- ticipants, or better selection of purposeful sampling of individuals or sites for the study. Implications for future research may include the use of the ﬁndings for practice (e.g., classrooms, schools, or with certain people such as adults or teenagers) or the need for further research (e.g., by gathering more extensive data or by asking additional questions of participants). You might also state implications for decision making, such as planning for new practices (e.g., better campus planning about how to handle violent incidents) or for the audience you identiﬁed in the introduction to your study.

8.6 How do you validate the accuracy of your findings?

Validating findings means that the researcher determines the accuracy or credibility of the ﬁndings through strategies such as member checking or triangulation. Several qualitative researchers have addressed this idea (Creswell & Miller, 2000; Lincoln & Guba, 1985). Qualitative researchers do not typically use the word bias in research; they will say that all research is interpretive and that the researcher should be self-reﬂective about his or her role in the research, how he or she is interpreting the ﬁndings, and his or her personal and political history that shapes his or her interpretation (Creswell, 2007). Thus, accuracy or credibility of the ﬁndings is of utmost importance. There are varied terms that qualitative researchers use to describe this accuracy or credibility (e.g., see authenticity and trustworthiness in Lincoln & Guba, 1985), and the strategies used to validate qualitative accounts vary in number (see eight forms in Creswell & Miller, 2000). Our attention here will be on three primary forms typically used by qualitative researchers: triangulation, member checking, and auditing.

 Qualitative inquirers triangulate among different data sources to enhance the accu- racy of a study. Triangulation is the process of corroborating evidence from different individuals (e.g., a principal and a student), types of data (e.g., observational ﬁeld notes and interviews), or methods of data collection (e.g., documents and interviews) in descriptions and themes in qualitative research. The inquirer examines each information source and ﬁnds evidence to support a theme. This ensures that the study will be accurate because the information draws on multiple sources of information, individuals, or processes. In this way, it encourages the researcher to develop a report that is both accurate and credible.

 Researchers also check their ﬁndings with participants in the study to determine if their ﬁndings are accurate. Member checking is a process in which the researcher asks one or more participants in the study to check the accuracy of the account. This check involves taking the ﬁndings back to participants and asking them (in writing or in an interview) about the accuracy of the report. You ask participants about many aspects of the study, such as whether the description is complete and realistic, if the themes are accurate to include, and if the interpretations are fair and representative.

 Researchers may also ask a person outside the project to conduct a thorough review of the study and report back, in writing, the strengths and weaknesses of the project. This is the process of conducting an external audit, in which researcher hires or obtains the services of an individual outside the study to review different aspects of the research. The auditor reviews the project and writes or communicates an evaluation of the study. This audit may occur both during and at the conclusion of a study, and auditors typically ask questions such as those men- tioned by Schwandt and Halpern (1988):

• Are the ﬁndings grounded in the data?

• Are inferences logical?

• Are the themes appropriate?

• Can inquiry decisions and methodological shifts be justiﬁed?

• What is the degree of research herbias?

• What strategies are used for increasing credibility?

Let’s return to Maria, who reﬂects on whether her own interpretation is “right.” You may recall that Maria realizes that the interpretation of her ﬁndings includes her own perspectives drawn from personal experiences. As a Latino, she is aware of the marginaliza- tion that some of the kids she interviews about weapon possession feel. She realizes, as well, that family support or lack of support plays a prominent role in Latino families, and that her interpretation of themes (e.g., “student alienation” or “right to protect myself”) will reﬂect her own concerns about these issues. How can Maria separate herself from her ﬁndings? Of course, the qualitative answer is that any interpretation must include the researcher’s personal stance. The larger question is whether Maria’s report is both accurate and credible to those she studies. Maria can validate her report by convening a small group of students and teachers she interviewed and having them read the narrative of her themes. During this process, the group will openly discuss whether the themes reﬂect their experiences, and then Maria can make additions or changes to her thematic discussion to report accurately and credibly on student and teacher experiences.

As you think about Maria checking the accuracy of her findings, what other approaches might she use?

References

1. Tesch, R. (1990). Qualitative research: Analysis types and software tools. Bristol, PA: Falmer Press.
2. Dey, E. L., & Hurtado, S. (1996). Faculty attitudes toward regulating speech on college campuses. The Review of Higher Education, 20, 15–32.
3. Dey, I. (1993). Qualitative data analysis: A user-friendly guide for social scientists. London: Routledge.
4. Miller, D. L., Creswell, J. W., & Olander, L. S. (1998). Writing and retellingmultiple ethnographic tales of a soup kitchen for the homeless Qualitative Inquiry, 4, 469–491.
5. Harry, B., Day, M., & Quist, F. (1998). “He can’t really play”: An ethnographic study of sibling acceptance and interaction. Journal for the Association of the Severely Handicapped (JASH), 23(4), 289–299.

Lecture 9 Reporting and Evaluating Research Lecture plan

9.1 WHAT IS A RESEARCH AND WHAT ARE ITS TYPES?

9.2 What Are the Types of Research Report?

9.3 Dissertation and Thesis Proposals

9.4 Quantitative and Qualitative Dissertation and Thesis Proposals

9.5 Journal Articles

9.6 How should you structure your report?

9.7 Balance your Research and Content

Research culminates in a report in different forms. This chapter addresses how to write and compose a research report and how to evaluate the quality of this report. It emphasizes the importance of audience, structuring your report for your audience, writing in a nondiscriminatory, ethical, and scholarly way, and using accepted evaluation criteria to assess the quality of your report.

9.1 WHAT IS A RESEARCH AND WHAT ARE ITS TYPES?

The steps in the process of research end with the development of a written report of your research. A research report is a completed study that reports an investigation or exploration of a problem; identiﬁes questions to be addressed; and includes data col- lected, analyzed, and interpreted by the researcher. It is composed for audiences, varies in length and format, and differs for quantitative and qualitative research.

What Audience Will Receive the Report?

For groups and individuals to understand and potentially use ﬁndings from research, you write the research report in a way that is acceptable to the intended audiences. Thus, a cardinal rule for writing is to write for the audience.

Rules and procedures in place at colleges and universities govern the criteria used by faculty advisors and committees. Journal reviewers and journal editors employ criteria presented once a year (typically) in their journals and often on the journal’s Web page. These criteria set forth, at least in general terms, the standards they use in reviewing a study submitted for publication, the types of research they seek to publish, and guidelines for authors to follow when submitting manuscripts. Policy makers and practicing educators in schools and other educational settings evaluate studies in terms of their clarity, simplicity, and utility for practice.

Conference paper reviewers often use speciﬁc guidelines for reviewing proposals submitted for presentation. In short, researchers need to consider the audience for the study and use both general standards available in the literature and speciﬁc standards for quantitative and qualitative research.

Maria needs to consider how she will write her research reports for both her school committee and for her graduate advisor. She considers the interests of each member of the school committee so that she can include some practical implications for each. As for her graduate advisor, she recognizes that he has high standards, has supervised many theses before, and probably has a format in mind for her ﬁnal thesis report. She also creates a to-do list to remind herself to get the information she needs before she proceeds with this phase of the process.

If you were Maria and needed to write a report as a requirement for your graduate degree, how would you write it? How would you write a report for your school commit- tee? List two or three writing strategies you would use. Then turn to the next sections and read about the types of research reports and their overall structures

9.2 What Are the Types of Research Report?

Students prepare dissertations and theses as a requirement for their doctoral and master’s programs. After completing the dissertation or thesis, researchers often condense it into a journal article for submission to an educational journal. Alternatively, they may present an abbreviated version of the dissertation or thesis at a national, regional, or state confer- ence or to individuals in their school setting.

After receiving comments from these audi- ences and making revisions based on these comments, they might submit the research to a journal for possible publication or ﬁle it with a school or school district

Dissertations and Theses

Dissertations and theses are the doctoral and master’s research reports prepared for faculty and graduate committees. The length of a dissertation or thesis can vary, depending on the tradition in a school or department. Faculty advisors and committees may prefer different approaches, which could affect which form is used. The doctoral dissertation might range from the shorter dissertation of 100 pages to more than 400 pages. These dissertations, conducted by doctoral graduate students, are usually longer than master’s theses. Master’s theses may run from 50 to 100 pages. In general, qualitative studies are much longer than quantitative studies. Qualitative researchers often report many quotes and present multiple perspectives on themes.

The process of preparing a dissertation or thesis involves planning the study (i.e., writ- ing the proposal) and presenting it to an advisor and a faculty committee (see appendix E for strategies for defending a research proposal). After receiving approval to conduct the study, the student completes the study and defends it before a faculty committee.

9.3 Dissertation and Thesis Proposals

A dissertation or thesis proposal is a plan for a research report, initiated and devel- oped before the research actually begins. We will not discuss proposals for external funding here because other writers have adequately covered them (see Locke, Spirduso, & Silverman, 2007), and they are beyond the scope of this text. Before discussing research proposals, however, it is helpful to distinguish them from research reports.

One essential difference between proposals and reports is that you will write a pro- posal before conducting the research. In a proposal, the researcher writes about what will take place; in the ﬁnal study, the investigator writes about what has taken place. This means that a proposal will likely be written using a future verb tense (i.e., will) to describe the action. In a ﬁnal study, the past verb tense (i.e., was) describes what has already occurred. However, when the proposal contains a pilot or preliminary study, you need to describe it as an action that has already occurred.

Another distinction between a proposal and the ﬁnal study is in the report of results and future research. In a proposal, you have not compiled results, nor have you identi- ﬁed future research needs. Thus, the proposal stops with the methods or procedure. A completed study, however, incorporates results and future research directions because you have already collected and analyzed the data.

To develop a dissertation or thesis, you ﬁrst create a proposal, which is a formal descrip- tion of a plan to investigate a research problem. This process begins by considering what topics to include in a plan so that readers can fully understand the project. The next step is to organize and format the plan to be consistent with quantitative or qualitative research. This initial planning process ends with a presentation of your proposal to a committee.

Proposing research is a major step in conducting research for a graduate program. The skills used in writing a proposal are the same skills needed for seeking external funding from public and private funding sources and for writing a plan for conducting a small-scale research study in school districts or other educational settings. Whether educators conduct their own research or evaluate someone else’s plan, knowing the importance of a proposal and the elements that go into it is important.

The purpose of a proposal is to help an investigator think through all aspects of the study and anticipate problems. A proposal also provides a written document that faculty and advisors can read, evaluate, and critique to improve a study. The research plan or proposal becomes a document to sell the study—a written narrative that must convince the faculty of the need, importance, and value of the proposed study. A well-deﬁned proposal:

\* Facilitates the process of obtaining permissions to study a site or educational setting.

\* Provides information to gatekeepers and those in authority so that they can deter- mine the likely impact of a study at their site.

\* Provides criteria to assess the quality of a project. Those evaluating and reviewing a study use these criteria. Knowing the proper elements of a good proposal permits evaluators to examine projects for these elements, and to determine, once you complete a project, whether it fulﬁlls its goals.

9.4 Quantitative and Qualitative Dissertation and Thesis Proposals

The topics in quantitative and qualitative proposals address the major ideas faculty often seek to know about a project. In the format for a quantitative proposal, most of the plan is included in three major sections: the “Introduction,” the “Review of the Literature,” and the “Methods.” In the format for a qualitative proposal, you will ﬁnd a less standardized structure. By allowing the study to emerge and to be based on the views of participants, qualitative researchers support a ﬂexible and open format for a proposal. Still, it is impor- tant for qualitative researchers to convey enough information to the readers to convince them of the merits of the study.

Recognizing the need for ﬂexibility, recent authors have advanced several formats for a qualitative proposal (e.g., Creswell, 2009; Marshall & Rossman, 2010) to provide guidance for students. Their recommendations, however, are ﬂexible enough to allow a study to emerge and to evolve based on what the researcher learns from participants in the ﬁeld.

The overall format for a qualitative proposal contains only two major sections: the introduction and the procedure .The qualitative proposal format does not contain a separate section on literature review. Instead, you combine the literature with a discussion on the anticipated outcomes of the studу, position it near the end of the proposal, and characterize it as optional. In a qualitative proposal the literature review documents the need to study the problem, but it does not lead to the research questions, as it does in quantitative research. In defending this position to faculty unfamiliar with qualitative research, you would provide this rationale for not including a separate literature review section in your proposal. However, if faculty request that you include a complete literature review in a proposal, it is wise to comply with the request. Still, at the end of the review, you might state that the review is tenta- tive and that it will be developed or completed later, after learning about the participants’ views. This stance would be consistent with good qualitative research. The qualitative proposal includes a “Procedure” section, in which you present the major characteristics of qualitative research and design as well as information about sampling and data analysis. The ﬁnal section presents a preliminary investigation of your topic, if you have completed such a study. This preliminary study might include interviews with a couple of individuals or ﬁeld observations of short dura- tion. The chief advantage of such an approach is to test whether you can collect and ana- lyze data from participants and see if your overall design is workable in the ﬁeld before receiving approval from your faculty committее.

9.5 Journal Articles

You prepare a journal article for readers of scholarly publications as well as for the editor and individuals who review the study. A journal article is a polished, shorter research report that you send to an editor of a journal. The editor arranges for two to three reviewers to provide comments about the study. The editor then makes a decision based on the reviewers’ comments, which typically falls into one of three categories: accept, revise and resubmit, or reject. Usually, when the reviewers accept the manuscript provi- sionally, they do so based on their anticipation of successful revisions by the author. If the article is accepted, the editor publishes it in an issue of the journal.

A journal article is much shorter than a thesis or dissertation because of page limita- tions imposed by publishers and editors of journals. Still, qualitative journal articles are much longer than quantitative articles because of the extensive quotes and the lengthy discussions of descriptions and themes. The format of quantitative and qualitative journal articles varies from one journal to another.

Sample Guidelines for Proposals

To illustrate the process of developing a proposal for a conference paper, we will exam- ine the AERA “Call for Proposals” that is printed each year in the Educational Researcher journal. The format of paper presentations at AERA has changed in recent years to allow for more innovative forms of presentations, such as interactive paper sessions, perform- ances, and town meetings. The most common form of presenting a single research study, called a paper session, requires that an author submit materials by a set deadline. You need to provide a summary about your research that includes:

\* Objectives or purposes

\* Perspective(s) or theoretical framework

\* Methods, techniques, or modes of inquiry

\* Data sources or evidence

\* Results and/or conclusions/point of view

\* Educational or scientiﬁc importance of the study (AERA, 1999, p. 33).

You send this summary to a program coordinator for one of AERA’s topical divi- sions or numerous special interest groups (SIGs). To decide what division to send your material to, you might contact the AERA central ofﬁce (www.aera.net). Two to three reviewers who do not know your identity will review your proposal. The review process may take 2 to 3 months, at which time the conference coordinators will inform you as to whether your proposal has been accepted or rejected for presentation.

9.6 HOW SHOULD YOU STRUCTURE YOUR REPORT?

A study with a clear structure is easy to understand and easy to read, even though the subject matter may be complex. A nationally known author on the subject of writing, Natalie Goldberg (2000), has stressed the importance of understanding the physical struc- ture of a writing project. The physical structure of a study is the underlying organization of topics that forms a structure for a research report. Think about a journal article that you have recently read. Was it difﬁcult or easy to understand? Were you able to read it quickly, or did you labor?

Look at the Physical Structure of Research Reports

Being able to identify the underlying structure of a research report will help you write a study as well as understand one. This is not always easy, but the following four tech- niques can help:

1. The easiest approach is to examine the different levels of headings used in a study. These headings are road signs used by an author to convey major points in a study. Although some headings are better descriptors of content than others are, examin- ing them helps you identify the structure of a study.

2. Look for the six steps in the research process. All reports, whether quantitative or qualitative, should contain a research problem, literature, a purpose statement and questions or hypotheses, data collection, data analysis and interpretation, and a reporting format.

3. Look for the research questions (or hypotheses) and the answers researchers develop to these questions (or hypotheses). For every question asked, researchers should pose an answer. Start with the introductory passages (i.e., “Introduction”) and then look at the end of the report (i.e., the “Results” or “Discussion”) to see how the authors answered the questions.

4. Finally, become familiar with the structures of different types of reports, especially approaches using quantitative and qualitative research.

Design an Appropriate Quantitative Structure

The body of the paper comprises ﬁve major sections. These are the same ﬁve sections typically found in published quantitative reports. Knowing this structure will help you read studies and understand where to look for information. For journal articles, the front matter and the back mat- ter sections are limited because of space constraints. For a dissertation or thesis, the researcher includes more front matter to help the reader understand the organization of the study. One front matter section, the abstract, is optional in reports, but, if you write it in a complete form to include all of the elements of an abstract, it helps the reader iden- tify the major parts of a study.

Another part of the body of the paper is the “Method” discussion. This section is likely to vary from one research report to another because of the different procedures authors use for their research designs.

Design an Appropriate Qualitative Structure

For a qualitative dissertation, thesis, and journal article, the structure varies consider- ably. For a qualitative report, such as a dissertation or thesis, authors mау include six to eight chapters. For example, Miller (1992) conducted a qualitative ethnog- raphy case study of the experiences of a ﬁrst-year president. She included the following 11 chapters:

Chapter 1 Introduction to the Studу Chapter 2 Path to the Presidency

Chapter 3 Early Surprises and Challenges Chapter 4 Building Relationships Chapter 5 Presidential Roles

Chapter 6 Providing Vision and Leadership Chapter 7 Initiating Change

Chapter 8 External Constituents Chapter 9 Struggles and Difﬁculties Chapter 10 The Spouse’s Role

Chapter 11 Summary, Conclusions, and Implications

The 11-chapter structure places emphasis on themes that emerged during the study. It does not include a separate chapter on the literature review or the speciﬁc procedures of the study.

In a qualitative scientific structure the researcher includes detailed proce- dures of inquiry and follows a traditional form for reporting research that includes the introduction, the procedures, the ﬁndings, and a discussion. However, a scientiﬁc qualitative report does differ from a standard quantitative format. In the qualitative scientiﬁc approach, you refer to procedures instead of methods, and ﬁndings instead of results. The format includes a rationale for qualitative research, a description of the site or individuals, and an analysis of themes. You ﬁnd this structural approach in qualitative designs such as case studies and in grounded theory studies.

HOW DO YOU WRITE IN A SENSITIVE, ETHICAL, AND SCHOLARLY WAY?

In addition to understanding the structure of a study, researchers engage in good writing practices when they compose a research report. They:

\* Are sensitive to individuals and use language that reduces bias

\* Use appropriate research terms

\* Write and report the ﬁndings ethically

\* Employ a point of view consistent with quantitative and qualitative approaches

\* Balance research and content

\* Interconnect parts of a study

\* Advance a concise title

9.7 Balance Your Research and Content

Some researchers feel that their report must demonstrate their knowledge of research more than the content or subject matter of their studies. Other researchers feel just the opposite. Regardless of emphasis, scholarly writing includes a balance between convey- ing knowledge about research and knowledge about the subject matter of the study (remember the two tracks of the railroad mentioned earlier).

When researchers overem- phasize methods, they may feel a need to convince faculty, graduate committee members, or journal editors of their knowledge of research methods. However, an underemphasis may indicate that the person lacks skills or knowledge about research. A good research report contains a balance between a discussion about research and the actual content of the study. This balance is in roughly a 50–50 proportion. For example, compare the following two models of a methods discussion about surveying department chairpersons.

Poor Model Displaying an Overemphasis on Method: In this project, survey random sampling will be used so that each department chair has an equal probability of being selected. Moreover, it is important to use stratiﬁcation procedures so individuals in the sample are selected in proportion to which they are represented in the population.

Better Model Displaying Balance: In this project, 400 academic chairpersons were randomly sampled so that results could be generalized to the population of academic chairpersons in Research I institutions of higher education (N = 2,000 chairs). Moreover, the 400 chairpersons represented both men and women chairs in proportion to which they were represented in the total population (300 males; 100 females).

The good model includes comments by the researcher that not only convey an understanding of adequate survey research methods but also inform the reader about the subject matter (the study of chairpersons) of the actual

**References**

Allen, L., & Calhoun, E. F. (1997, November 30). *Schoolwide action research: Findings from six years of study.* Phi Delta Kappan. Retrieved October 24, 2020, from https://eric.ed.gov/?id=EJ565111

Barzun, J., & Graff, H. F. (2012). *The modern researcher*. Wadsworth Cengage Learning.

Bausell, R. B. (1997). *Conducting meaningful experiments: 40 steps to becoming a scientist*. Sage Publications.

Brown, B. L., & Hedges, D. (2009). Use and misuse of quantitative methods: Data collection, calculation, and presentation. *The Handbook of Social Research Ethics*, 373–386. https://doi.org/10.4135/9781483348971.n24

Charmaz, K. (2015). *Constructing grounded theory*. Sage.

Creswell, J. W., & Guetterman, T. C. (2021). *Educational research: Planning, conducting, and evaluating quantitative and Qualitative*. Pearson Education Limited.

Kauchak, D. P., & Eggen, P. D. (2012). *Learning and teaching: Researchbased methods*. Pearson.

LeCompte, M. D., Millroy, W. L., & Preissle, J. (2008). *The Handbook of Qualitative Research in Education*. Emerald.

McBurney, D., & White, T. L. (2010). *Research methods*. Wadsworth Cengage Learning.

McGee, B. C. A., & Banks, J. A. (2004). *Handbook of Research on Multicultural Education*. JosseyBass.

*Randomized experiments for planning and Evaluation*. SAGE Research Methods. (2011, January 1). Retrieved October 24, 2020, from https://methods.sagepub.com/Book/randomizedexperimentsforplanningandevaluation