16

Mixed Methods Designs

If you have access to both quantitative and qualitative data, you can use both forms of data in combination to understand your research problem and answer your research question. This combination will provide new insights and new ways to understand your data. With qualitative research now accepted by educational researchers, and with quantitative research long established as an approach, mixed methods has become popular as the newest development in educational research methods. This chapter provides an introduction to mixed methods. It defines mixed methods research, identifies when research problems merit its use, assesses the key characteristics of it, highlights ethical issues that may arise when using it, and advances the steps in conducting and evaluating this design.

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

- Describe mixed method research, its use, and its development.
- Identify the major types of mixed methods designs.
- Describe the key characteristics of mixed methods research.
- Identify some potential ethical issues in mixed methods research.
- Understand the steps used in conducting mixed methods research.
- List criteria for evaluating a mixed methods study.

Maria chooses to collect both quantitative and qualitative data. She decides to conduct a survey and then follow up with interviews with a smaller, purposeful sample of students to explain in more detail the survey results. She views this research in two phases. For the first, quantitative phase, her research question is "What factors influence student attitudes toward weapon possession?" Later, in the follow-up, qualitative phase, her question is "When students mention 'peers' as a factor influencing student attitudes to weapons, what do they mean?" In this study, Maria collects quantitative survey data and then follows up with qualitative interview data to help explain the initial quantitative results. Maria conducts a study using mixed methods research.

WHAT IS MIXED METHODS RESEARCH, WHEN IS IT USED, AND HOW DID IT DEVELOP?

A **mixed methods research design** is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative methods in a single study or a series of studies to understand a research problem (Creswell & Plano Clark, 2018). The basic assumption is that the use of both quantitative and qualitative methods, in combination, provides a better understanding of the research problem and questions than either method by itself.

If you use this design, you need to understand *both* quantitative and qualitative research. This makes this type of design one requiring specific skills. In addition, the procedures are time-consuming, requiring extensive data collection and analysis, and may require that you participate in a research team with diverse skills when using them. In addition, mixed methods research is not simply collecting and analyzing two distinct "strands" of research—qualitative and quantitative. It consists of merging (combining), connecting (having one database explain the other), building (having one database build something new to be used in the other), and embedding (placing one database within another larger database). In short, the data are "mixed" or "integrated" in a mixed methods study.

When Do You Conduct a Mixed Methods Study?

There are several reasons for using a mixed methods design to conduct a study. In general, you conduct a mixed methods study when you have both quantitative and qualitative data, and these types of data, together, provide a better understanding of your research problem than either type by itself. Mixed methods research is a good design to use if you seek to build on the strengths of both quantitative and qualitative data. Quantitative data, such as scores on instruments, yield specific numbers that can be statistically analyzed, can produce results to assess the frequency and magnitude of trends, and can provide useful information if you need to describe trends about a large number of people. However, qualitative data, such as open-ended interviews that provide actual words of people in the study, offer many different perspectives on the study topic and provide a complex picture of the situation. When one combines quantitative and qualitative data, "we have a very powerful mix" (Miles, Huberman, & Saldaña, 2014, p. 44). For example, by assessing the outcomes of a study (i.e., quantitative) as well as the process (i.e., qualitative), we can develop a "complex" picture of social phenomena (Greene & Caracelli, 1997, p. 7).

You also conduct a mixed methods study when one type of research (qualitative or quantitative) is not enough to address the research problem or answer the research questions. More data are needed to extend, elaborate on, or explain the first database. For example, you may want to first explore the data qualitatively to develop an instrument or to identify variables to test in a later quantitative study. You may also engage in a mixed methods study when you want to follow up a quantitative study with a qualitative one to obtain more detailed, specific information than can be gained from the results of statistical tests.

You use mixed methods when you want to provide alternative perspectives in a study. An example of this would be an experimental study in which the experiment yields useful information about outcomes, but the additional collection of qualitative data develops a more in-depth understanding of how the experimental intervention actually worked. Another example would be when a policymaker wants both the "numbers" and the "stories" about an issue. These different sources of information provide both general trends about a problem as well as detail. On a practical level, mixed methods studies are increasingly being published in the scholarly literature. Students in graduate programs use mixed methods because they want to experience the latest research methods approach. These students may

also be in graduate programs in which qualitative research has yet to be fully accepted and in which quantitative approaches are the norm. Although individuals in these programs may recognize the value of qualitative research, a mixed methods study is more acceptable than a "pure" qualitative study because there is still a component of quantitative research in the study. However, students are increasingly conducting mixed methods dissertations, which may also reflect a turn in its acceptance and recognition of the value of mixed methods, particularly as these students continue on to faculty-level positions (McKim, 2017).

How Did Mixed Methods Research Develop?

The historical development of mixed methods research has been outlined elsewhere (e.g., Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 1998), and this review builds on these earlier discussions. We can trace this evolution through several phases.

Mixing Forms of Quantitative Data

Since the 1930s, educational and social science investigators had been collecting multiple methods of data (Sieber, 1973). Then, Campbell and Fiske (1959) introduced the multitrait, multimethod approach, stimulating interest in employing multiple methods in a single study. Campbell and Fiske's interest was not in mixed methods research; rather, they sought to develop valid psychological traits by collecting multiple forms of quantitative data. To develop these traits, they suggested a process whereby researchers would collect multiple measures of multiple traits and assess each measure by at least two methods. When they correlated scores and placed them into a matrix, a multimethod, multitrait matrix resulted. An investigator could determine if the trait was valid by examining this matrix and assessing whether the measures of the trait correlated higher with each other than they did with measures of different traits involving separate methods. Evidence from these correlations provided useful information about different forms of validity. At a broader level, the use of multiple methods to measure a trait encouraged other researchers to collect more than one type of data, even if such data were only quantitative, such as peer judgment scores and word association tests.

Combining Quantitative and Qualitative Data

Soon, others were collecting multiple forms of data, but now it consisted of quantitative and qualitative information. By 1973, Sieber suggested the combination of in-depth case studies with surveys, creating a "new style of research" and the "integration" of research techniques within a single study (p. 1337). A few years later, Jick (1979) used the combination of surveys, semistructured interviews, observations, and archival materials to provide a "rich and comprehensive picture" (p. 606) of anxiety and job insecurity during organizational mergers.

Jick's (1979) study was more than an examination of mergers; his article used the merger study to illustrate the procedure of triangulating data. *Triangulation*, a term drawn from naval military science, is the process whereby sailors use multiple reference points to locate an object's exact position at sea (Jick, 1979). Applied to research, it meant that investigators could improve their inquiries by collecting and combining (or integrating) different kinds of data bearing on the same phenomenon. The three points to the triangle are the two sources of the data and the phenomenon. This improvement in inquiries would come from blending the strengths of one type of method and neutralizing the weaknesses of the other. For example, in a study of middle school principal leadership, a researcher can augment qualitative observations of behavior with a quantitative survey in order to provide a more complete understanding of leadership. Integrating data in a single study continues to be an attractive approach to mixed methods research today.

Questioning the Integration of Worldviews and Methods

Further developments on procedures, however, had to wait for several years. The issue arose as to whether quantitative and qualitative research could be combined because each approach drew on different philosophical assumptions. This debate was more than tension between those who embraced traditional quantitative research and those advocating for qualitative inquiry. The issue was whether a researcher who used certain methods also needed to use a specific worldview—the "compatibility" (Tashakkori & Teddlie, 1998) between worldviews and methods. Worldviews are the broad philosophical assumptions that researchers use when they conduct studies. Although some researchers may not recognize it, they make assumptions about knowledge (e.g., math scores exist to demonstrate achievement for seventh graders) and how it can be obtained (e.g., we can measure math ability using standardized achievement tests). Those who argued for "incompatibility" said that quantitative methods (e.g., student scores on an instrument) belonged to one worldview (e.g., an attempt to measure, objectively, student achievement), whereas qualitative methods (e.g., an observation of students) apply to another worldview (e.g., the researcher assesses reality subjectively through his or her lens). The logic of this argument led to the conclusion that mixed methods research was untenable because a single worldview did not exist for the inquiry.

The worldview–method argument—called the paradigm debate—played out for several years during the late 1980s and early 1990s, especially at national conferences such as the American Evaluation Association's annual meetings (Reichardt & Rallis, 1994). But it has largely diminished because of several factors. Some said that those who argued for the incompatibility of worldviews and methods created a false dichotomy (Reichardt & Cook, 1979) that does not hold under close inspection. For example, there is an "objective" reality (e.g., the classroom), but under close inspection there is also a "subjective" reality (e.g., we see different things as we look at a classroom). Some methods are more closely associated with one worldview than the other, but to categorize them as "belonging" to one worldview more than another creates an unrealistic situation.

Others have contended that mixed methods research has its own philosophical worldview: pragmatism. The pragmatists, for example, believe philosophically in using procedures that "work" for a particular research problem under study and that you should use many methods when understanding a research problem (e.g., see the discussion in Tashakkori & Teddlie, 1998). In addition, the dialectical position, embraced by Greene and Caracelli (1997), recommends that researchers report the multiple worldviews they hold—thus honoring worldviews as important—and also collect both quantitative and qualitative data. Other philosophies have emerged as a foundation for mixed methods research, such as the transformative research perspective advancing the need for addressing issues of social justice for underrepresented groups (Mertens, 2009); the critical realist perspective, which combines both subjective and objective assessments (Maxwell, 2012); and dialectic pluralism (Johnson, 2017), which embraces multiple divergent approaches and paradigms to gain new insights.

Most recently, dialectical pluralism builds on the early work of Jennifer Greene (2007) that urges mixed methods researchers to respectfully engage with different worldviews. The major characteristics of dialectical pluralism are (Johnson, 2017):

- Engage with differences across disciplines, paradigms, theories, and stakeholders/citizens;
- Incorporate differing values in conducting research;
- Guide and judge research with clear statements of values;
- Conduct ethical research;
- Disseminate and use research results;
- Evaluate research outcomes and the use of research results.

Dialectical pluralism embraces differences and engages with those differences to design and conduct research.

Developing Procedures for Mixed Methods Studies

Another factor that quieted the debate was the increased interest in the procedural aspects of conducting mixed methods research. Authors explored the "purposes" of mixed methods research, identified alternative designs to use, and specified a notation system and visual models for these designs.

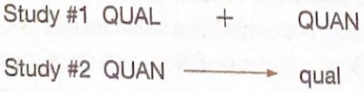
The idea of triangulation had already introduced one purpose for mixing methods—to integrate multiple databases to understand a phenomenon and research problem (Rossman & Wilson, 1985). Other reasons soon emerged. You could collect quantitative and qualitative data separately in two phases so that data from one source could enhance, elaborate, or complement data from the other source (Greene, Caracelli, & Graham, 1989). In more complicated designs, the data collection could extend from two to three phases (e.g., see Miles & Huberman, 1994) or be collected from multiple levels in an organization, such as the district, school, teacher, and student (e.g., see Tashakkori & Teddlie, 1998; Teddlie & Tashakkori, 2009). You could also embed data, with one form of data becoming less important in a design emphasizing the other form of data (Creswell, 2014).

Central to this thinking about different models or designs has been the visualization of procedures and the use of a notation system designed by Morse (1991). This system, shown in Figure 16.1, is a way to portray the procedures in mixed methods designs. Shorthand labels for quantitative (quan) and qualitative (qual) simplify the terms.

Figure 16.1 also portrays two sample designs. As shown in Study #1, a researcher places an emphasis on both quantitative and qualitative data and integrates or combines the data in the study. In Study #2, the investigator emphasizes quantitative data in the first phase of a study, followed by a minor emphasis on qualitative data in the second phase of the study. Later in this chapter, we consider names for these designs and explore several variations.

FIGURE 16.1

Notation System for a Mixed Methods Study



Notation Used:

+ indicates the simultaneous or concurrent collection of quantitative and qualitative data.

→ shows the sequential collection of quantitative and qualitative data.

Uppercase letters indicate a priority or increased weight for either the quantitative or qualitative data.

Lowercase letters indicate a lower priority or weight for either the quantitative or qualitative data.

Source: Adapted from Morse (1991).

Advocating for a Distinct Design

With emerging procedures, a notation system, and specific designs, the discussion has turned to viewing mixed methods research as a separate and distinct design. To experiments, surveys, grounded theory, and others, we now add mixed methods research or incorporate this form of research into these designs. Advocates for mixed methods research have written entire chapters and books on its use in the social and health sciences (Creswell, 2014; Creswell & Plano Clark, 2018; Greene, 2007; Tashakkori & Teddlie, 1998, 2011). In addition, refinements continue in the process of data analysis in mixed methods research (Caracelli & Greene, 1993); the use of computer programs for merging quantitative statistical programs with text analysis programs (Bazeley, 2000, 2011; Guetterman, Creswell, & Kuckartz, 2015); and the identification and discussion of numerous mixed methods studies reported in the scholarly literature (e.g., Creswell & Plano Clark, 2018; Greene et al., 1989).

Reflective Period

In the past 5 to 7 years, mixed methods has entered a new historical period in its evolution. This reflective period is characterized by three major themes: a current assessment or mapping of the field, the emergence of constructive criticisms and reassessments that have challenged the nature of mixed methods research, and the expansion to many disciplines and countries in the world. The mapping of the field consists of establishing priorities for research in mixed methods (Tashakkori & Teddlie, 2003), identifying the domains of inquiry (Greene, 2007), and summarizing topics being addressed so that emerging and experienced scholars can add to the ongoing discussions (Creswell, 2011b). The challenges that have arisen in the past few years have come from scholars around the world and range from more basic concerns about a definition and language for mixed methods to philosophical issues of "mixing" paradigm and the dominant discourse in the field to the applied issues of the types of designs and the claims being advanced by mixed methods researchers (Creswell, 2011a). These controversies signal a healthy development for mixed methods research. For example, the controversial discussion by Freshwater (2007) asks for a greater openness to new ideas in mixed methods and to challenge accepting key ideas without reservation. Finally, the past few years have seen an expansion of interest in mixed methods that has pervaded many social and health science disciplines. It has been encouraged through significant U.S. federal funding agencies, such as the National Institute of Health report on "best practices" for mixed methods research (Creswell, Klassen, Plano Clark, & Smith, 2011). Worldwide, it has also attracted interest through conferences, symposia, and international empirical articles reported in mixed methods–oriented journals, such as the *Journal of Mixed Methods Research*.

Most recently, the Mixed Methods International Research Association (mmira.org) has formed as the scholarly home of researchers conducting mixed methods and methodologists interested in mixed methods. MMIRA provides resources on mixed methods for its members, disseminates news and information about mixed methods, and hosts conferences. MMIRA holds a major international conference every 2 years with regional conferences in the interim years. Students enrolled in a program can join for a nominal fee.

MyLab Education Self-Check 16.1

WHAT ARE THE TYPES OF MIXED METHODS DESIGNS?

Although work has begun on identifying types of mixed methods designs, many models and approaches have been advanced in the literature. (To review the possibilities, see the discussions by Creswell & Plano Clark, 2018.) The strategy that authors have taken is to review published studies and classify them by type of design.

Before examining the types of designs, it might be helpful to reflect on useful strategies for identifying a mixed methods study reported in the published literature. One strategy is to ask the following questions to help you identify a study as mixed methods research:

- *Is there evidence in the title?* Look at the title to determine if it includes words such as *quantitative and qualitative, mixed methods*, or other related terms to signify the collection of both quantitative and qualitative data. Related terms might be *integrated, combined, triangulation, multimethod*, or *mixed methodology* (Tashakkori & Teddlie, 1998).
- *Is there evidence in the data collection section?* Examine the "Methods" or "Procedure" section where the author addresses data collection and identify if researchers discuss forms of quantitative data (i.e., numbers reported with closed-ended questions) and qualitative data (i.e., words or images with open-ended questions) as part of the data collection.
- *Is there evidence in the purpose statement or the research questions?* Examine the abstract or the introduction of the study to identify the purpose or research questions. Do these statements indicate that the researcher intends to collect both quantitative and qualitative data during the study?

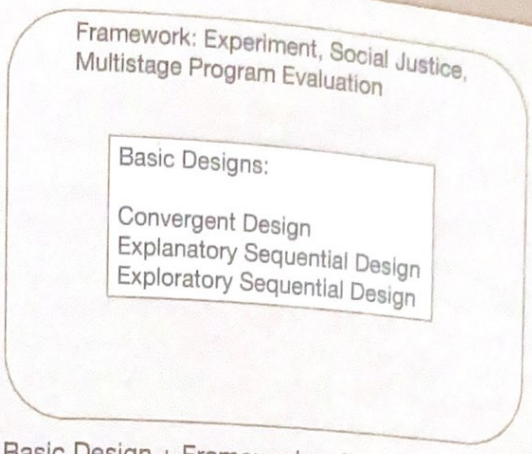
Having identified the study as mixed methods, next determine the type of mixed methods design the author is using. You might ask the following questions:

1. *Intent. What is the intent for combining the quantitative and qualitative data?* Intent relates to whether the idea is to compare the two databases, to validate one database with another, or to gain a more complete understanding of a problem. All these intents relate to merging the two databases in a convergent design. Other intents could be to have one database explained by the other or to build from one database to something new. These are the sequential designs, either explanatory or exploratory. A final intent may be to embed or encase one database within some larger framework, such as an experiment or a theory, or within a long-term sustained line of inquiry (all these are advanced designs).
2. *Timing. What is the sequence of collecting the quantitative and qualitative data?* Determine whether the qualitative data (or quantitative data) come first or second in the data collection or whether they are collected concurrently.
3. *Emphasis. What priority or weight does the researcher give to the quantitative and qualitative data collection?* Priority or weight means that one form of data is given more attention or emphasis in the study; however, quantitative and qualitative data are sometimes treated equally.

Using these three questions, you can locate and identify most mixed methods designs commonly used in educational research.

Figure 16.2 portrays the six major designs that will be emphasized here. Variations occur on each of these six designs, but they are the major forms of mixed methods research typically used by educators today. The way to view this figure is to see that the basic designs—convergent, explanatory sequential, and exploratory sequential—are at the heart of mixed methods designs. One should first look to see which one of these three basic designs is being used in a mixed methods study. However, these basic designs might be framed by something larger, such as an experiment, a social justice orientation, or a multistage program evaluation. In this way, the basic design then becomes a complex design. Granted, designs may emerge during a study and not planned in final form at the outset of a project. For those designing a mixed methods project in education, however, starting with the conceptualization of a basic design as the major intent of a study and possibly framing this basic design within a more complex feature is a useful way to view designs.

FIGURE 16.2
Mixed Methods Basic and Advanced Designs



Thus, six mixed methods designs are discussed here. First, we enumerate the basic designs:

- The convergent design
- The explanatory sequential design
- The exploratory sequential design

And then the complex designs:

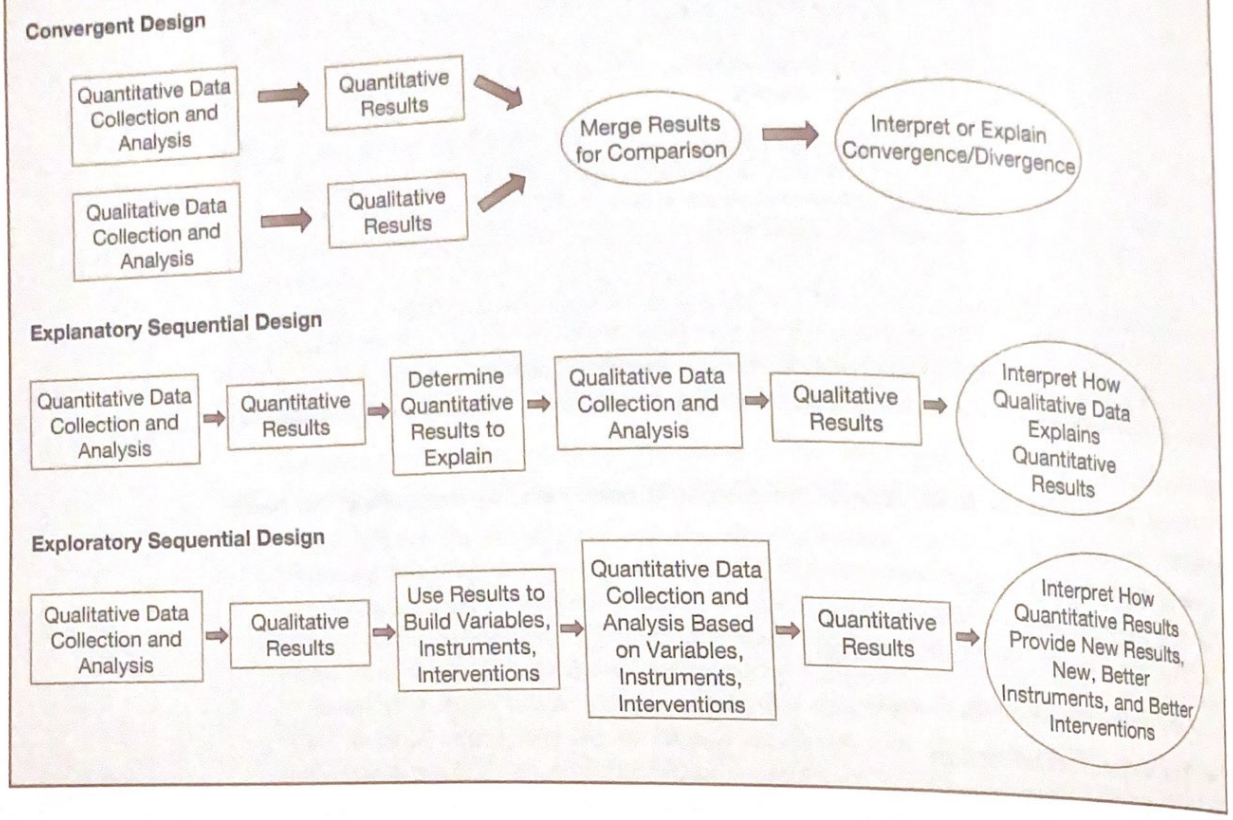
- The experimental design
- The social justice design
- The multistage evaluation design

The Convergent Design

The purpose of a **convergent** (or **parallel** or **concurrent**) **mixed methods design** (called a convergent design for a short label) is to simultaneously collect both quantitative and qualitative data, merge the data, compare the results, and explain any discrepancies in the results. A basic rationale for this design is that one data collection form supplies strengths to offset the weaknesses of the other form and that a more complete understanding of a research problem results from collecting both quantitative and qualitative data. It is based on the core assumption that qualitative data (open-ended data) and quantitative data (closed-ended data) provide different results in a study and can be used as a check for one another. For example, quantitative scores on an instrument from many individuals provide strengths to offset the weaknesses of qualitative documents from a few people. Alternatively, qualitative, in-depth observation of a few people offers strength to quantitative data that does not adequately provide detailed information about the personal experiences of individuals and a detailed understanding of the setting in which they respond to research problems.

How does the process of a convergent study work? The researcher gathers both quantitative and qualitative data, analyzes both data sets separately, compares the results from the analysis of both data sets, and makes an interpretation as to whether the results support or diverge. If the results diverge, then the researcher provides an explanation for

FIGURE 16.3
Basic Mixed Methods Designs



this divergence, drawn from gathering more data, re-analyzing the databases, or more closely inspecting the quality of both forms of data. The direct comparison of the two data sets by the researcher provides a "convergence" of data sources. As shown in Figure 16.3, in this design, the mixed methods researcher does the following:

- *Intends to compare the quantitative and qualitative results from a study in order to see if they converge and provide similar results.*
- *Often gives equal priority to both quantitative and qualitative data.* The researcher values both quantitative and qualitative data and sees them as approximately equal sources of information in the study. For example, interview data are as important as the scores gathered on an instrument.
- *Collects both the quantitative and the qualitative data concurrently or simultaneously during the study.* Qualitative documents about what the students learn in preschool are reviewed, for example, at the same time that the researcher collects quantitative observations on student behavior using a checklist.
- *Compares the results from quantitative and qualitative analyses to determine if the two databases yield similar or dissimilar results.* This comparison may occur in several ways. The most popular approach is to describe the quantitative and qualitative results side by side in a discussion section of a study. For example, the researcher would first present the quantitative statistical results and then provide qualitative quotes to either confirm or disconfirm the statistical results. Another approach is

to actually merge the quantitative and qualitative data in a single table or graph. For each major topic in the study, the researcher could array in a table the quantitative results and the qualitative themes in columns that match each topic. A third approach is to transform one of the data sets so that they can be directly compared with the other data set. For example, qualitative themes identified during interviews are "quantified" and given a score as to their frequency. These scores are then compared with scores from instruments measuring variables that address the same ideas as the themes.

The strength of this design is that it combines the advantages of each form of data; that is, quantitative data provide for generalizability, whereas qualitative data offer information about the context or setting. This design enables a researcher to gather information that uses the best features of both quantitative and qualitative data collection. One difficulty with this design is how to merge the two forms of data and, when this is done, to determine how to assess results that diverge. If the results diverge, then this divergence needs to be explained. Often, researchers will return to the original databases and assess whether the results need to be re-analyzed, or they will collect new data. In either case, an explanation is merited in a study.

In a convergent mixed methods study, Guetterman and Mitchell (2016) examined the role of leadership and culture in promoting meaningful faculty assessment practices in a higher education institution. They conducted the study around a faculty inquiry project designed to promote faculty members' use of assessment information to improve student learning. Quantitative outcomes were evaluated through a series of pre-post measures: knowledge and personal dispositions about assessment, institutional encouragement to engage with assessment, action orientation versus a passive view, compatibility with expectations, and assessment quality. They reported descriptive statistics and statistical tests of pre-post differences using an ANOVA. In addition, they examined organizational characteristics, such as university leadership support and faculty rewards for assessment. Qualitative data sources included open-ended survey items, open-ended narrative written responses, and analysis of posters that faculty participants produced. After analyzing qualitative and quantitative sources, the authors merged the results. Integrating qualitative data "revealed the contextual nuances, indicating that, when faculty members view assessment beyond the scope of meeting accreditation, they see additional possibilities and learn from the assessment in other ways" (Guetterman & Mitchell, 2016, p. 54).

The Explanatory Sequential Design

Instead of collecting data at the same time and merging the results, a mixed methods researcher might collect quantitative and qualitative information sequentially in two phases, with one form of data collection following and informing the other. This design, also shown in Figure 16.3, is an explanatory mixed methods design—perhaps the most popular form of mixed methods approach in educational research. An **explanatory sequential mixed methods design** (also called a two-phase model; Creswell & Plano Clark, 2018) consists of first collecting quantitative data and then gathering qualitative data to help explain or elaborate on the quantitative results. The rationale for this approach is that the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection, is needed to refine, extend, or explain the general quantitative picture. Referring back to Figure 16.3, you can see the following in this design:

- *The intent of this design is to explain the quantitative results with qualitative data.* This explanation is based on the assumption that surprising or unexpected results

may occur in the quantitative phase of the study. These results beg for further explanation. In addition, expected results may occur, but these are so general that a follow-up is needed to further understand them. In these cases, a qualitative data collection phase follows the quantitative phase.

- *The mixed methods researcher places a priority on quantitative data (QUAN) collection and analysis.* This is done by introducing it first in the study and having it represent a major aspect of data collection. A small qualitative (qual) component typically follows in the second phase of the research.
- *The mixed methods researcher collects quantitative data first in the sequence.* This is followed by the secondary qualitative data collection. Researchers often present these studies in two phases, with each phase clearly identified in headings in the report.
- *The mixed methods researcher uses the qualitative data to refine the results from the quantitative data.* This refinement leads to exploring a few typical cases, probing a key result in more detail, or following up with outlier or extreme cases.

This design has the advantage of clearly identified quantitative and qualitative parts, an advantage for readers as well as for those designing and conducting the study. Unlike the convergent design, the researcher does not have to converge or integrate two different forms of data. This design also captures the best of both quantitative and qualitative data—to obtain quantitative results from a population in the first phase and then refine or elaborate these findings through an in-depth qualitative exploration in the second phase. The difficulty in using this design, however, is that the researcher needs to determine what aspect of the quantitative results to follow up on. This follow-up means deciding on the participants to sample in the second qualitative phase as well as, more important, the questions to ask in this follow-up phase that builds on the initial quantitative phase. In addition, this design is labor-intensive and requires both expertise and time to collect both quantitative and qualitative data in sequence.

A two-phase project by Ivankova and Stick (2007) is a good example of an explanatory sequential design. Their research examined factors contributing to students' persistence in a distributed (online) doctoral program in educational leadership in higher education. They called their study a "sequential explanatory study" (Ivankova & Stick, 2007, p. 93). They first gathered quantitative survey data from 278 current and former students and then followed up with four qualitative case study respondents to explore the survey responses in more detail. This project illustrates rigorous quantitative methods using good sampling and sophisticated data analysis as well as persuasive qualitative case study procedures that illustrate the development of themes for each case and a cross-case comparison. They present a good figure of their mixed methods procedures showing the quantitative and the qualitative phases, followed by summarizing both results. By studying four specific cases as a follow-up, they were able to gain greater insight into the important predictors of student persistence.

The Exploratory Sequential Design

Rather than first analyzing or collecting *quantitative data* as is done in the explanatory sequential design, the mixed methods researcher begins with *qualitative data* and then collects quantitative information. The purpose of an **exploratory sequential mixed methods design** (called an exploratory sequential design) involves the procedure of first gathering qualitative data to explore a phenomenon and then collecting quantitative data to explain relationships found in the qualitative data. A popular application of this design is to explore a phenomenon, identify themes, design an instrument, and subsequently test it. Researchers use this design when existing instruments, variables, and

measures may not be known or available for the population under study. Again referring to Figure 16.3, you can see the following in this design:

- *The intent of this design is to first explore qualitatively with a sample in order to determine what questions to ask, what variables to measure, and what people to ask.* The basic assumption of this design is that the questions, variables, and individuals to participate are not known in advance because of the newness of the topic, the uniqueness of participants, or the location where the study occurs (e.g., in some international country).
- *The mixed methods researcher emphasizes the qualitative data (QUAL) more than the quantitative data (quan).* This emphasis may occur through presenting the overarching question as an open-ended question or discussing the qualitative results in more detail than the quantitative results.
- *The mixed methods researcher has a sequence to data collection that involves first collecting qualitative data followed by quantitative data.* Typically in these designs, the researcher presents the study in two phases, with the first phase involving qualitative data collection (e.g., interviews and observations) with a small number of individuals, followed by quantitative data collection (e.g., a survey) with a large, randomly selected number of participants.
- *The mixed methods researcher plans on the quantitative data to build on or explain the initial qualitative findings.* The intent of the researcher is for the quantitative data results to refine and extend the qualitative findings by testing out an instrument, develop a typology or classification, and identify procedures for an experimental intervention from the qualitative findings. In both cases, the initial qualitative exploration leads to detailed, generalizable results through the second quantitative phase.

One advantage of this approach is that it allows the researcher to identify measures actually grounded in the data obtained from study participants. The researcher can initially explore views by listening to participants, rather than approach a topic with a predetermined set of variables. However, it has the disadvantage of requiring extensive data collection as well as the time required for this process. The testing of an instrument adds considerably to the length of time this design requires to be implemented. It also asks researchers to make decisions about the most appropriate qualitative data (e.g., quotes, codes, and themes) to use in the follow-up quantitative phase of the study.

In the exploratory sequential mixed methods design by Crede and Borego (2013), the authors examined the retention of graduate engineering students. They first conducted an ethnographic qualitative study consisting of observations and interviews. The qualitative phase yielded themes concerning diversity and international students, organization and climate of the research group, student perception of value, and learning. The authors systematically used these themes to identify quantitative constructs to measure and develop survey items to assess retention. They then employed building integration. After developing the survey, they tested it with a sample to gather validity evidence and reliability. Their article provides one example of the systematic process of mixed methods inquiry to build a quantitative survey.

The Experimental Design

The convergent, explanatory, or exploratory basic designs may be framed within some larger dimension or perspective, such as an experiment, a social justice orientation, or an evaluation procedure. The purpose of the **experimental design** is to encase a basic mixed methods design within an experiment. This means essentially that the researcher adds qualitative data collection, analysis, and results to an experiment. As shown in

FIGURE 16.4
Complex Mixed Methods Designs

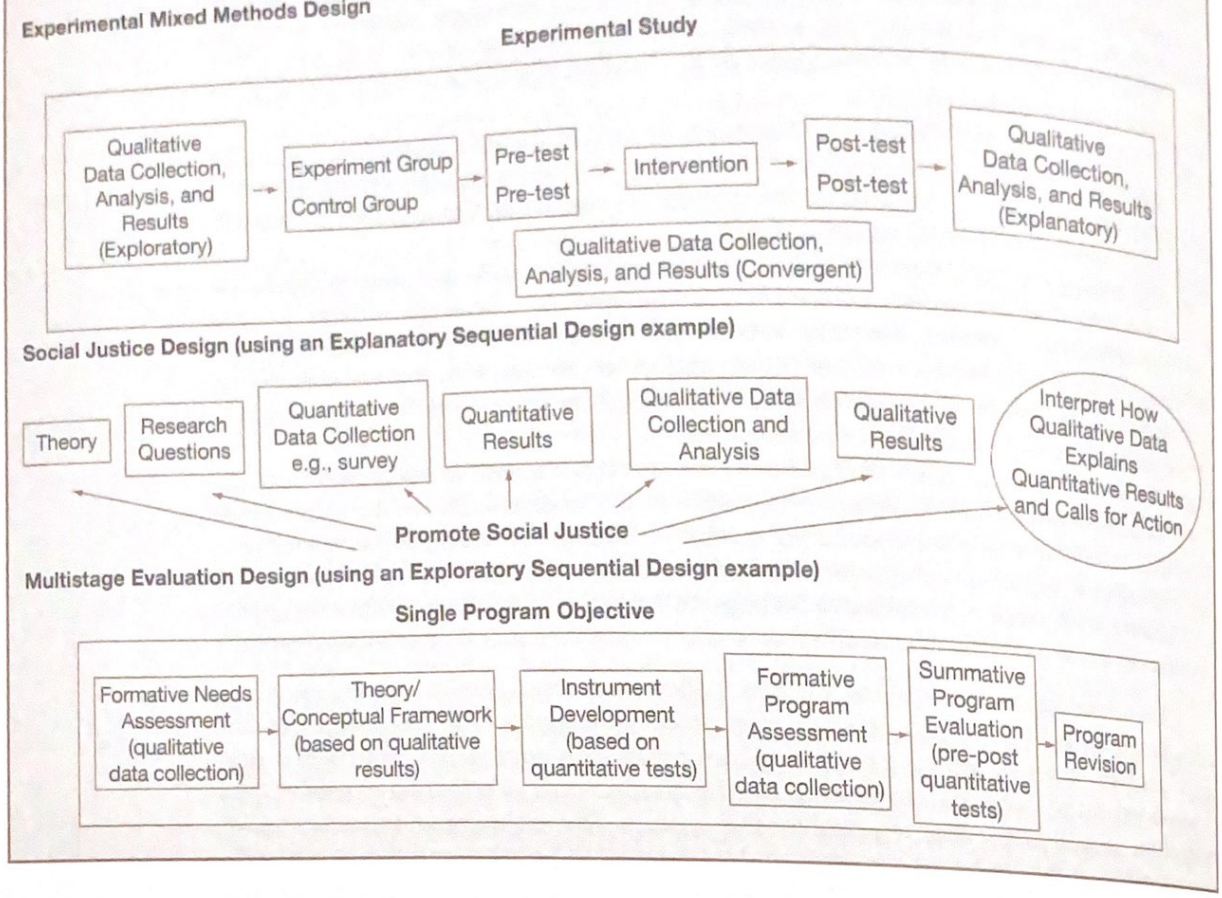


Figure 16.4, qualitative data may be added to an experiment either before the experiment begins, during the experiment, or after the experiment (or at all or several of these times). In this way, the qualitative data augments or supports the experimental procedure. A variation on this approach might be to have quantitative data, such as a survey, added to a larger qualitative study, such as an ethnography, but this type of design is infrequently found in the literature. In an experiment, for example, the researcher may collect qualitative data to examine how participants in the treatment condition are experiencing the intervention. In this case, the basic design within the experiment is a convergent design. Collecting data before the experiment can help to design an intervention tailored to the participants (using an exploratory sequential design). Collecting data after the experiment can help to explain and follow up on the quantitative outcome results (using an explanatory sequential design).

How does the process of an experiment mixed methods design work? The researcher collects both quantitative data and qualitative data during a single study (e.g., in an experiment, the two data sets are analyzed separately and address different research questions). For example, the quantitative data will address whether the intervention had an impact on the outcomes, whereas the qualitative data will assess how the participants experienced the intervention. As shown in Figure 16.4, in this design, the mixed methods researcher does the following:

- *Adds qualitative data to an experiment either before the experiment begins, during the experiment, or immediately after the experiment concludes.* The intent of the qualitative data is to involve participants and their experiences in the experiment, as opposed to relying solely on the responses to measures that they provide.
- *Gives priority to the major form of data collection (e.g., often quan) and secondary status to the supportive form (e.g., often qual) of data collection.* The secondary form is used in the mixed methods study to support and provide additional information to the primary form.
- *Collects both the quantitative and qualitative data concurrently or sequentially.* Both forms of data are collected during the study at roughly the same time or in sequence. This means that the basic design can be convergent, explanatory, exploratory, or some combination thereof in the study. It is important to understand and describe the purpose for which the secondary data are being collected.
- *Uses the secondary form of data to augment or provide additional sources of information not provided by the primary source of data.* The augmentation is to gather information that typically addresses a different question than asked for by the primary form of data. For example, the collection of qualitative data during an experiment may be to understand the "process" the participants are going through, whereas the investigators use quantitative data to assess the impact of the treatment on the outcomes.

The strength of this design is that it combines the advantages of both quantitative and qualitative data. Quantitative data are more effective at recording outcomes of the experiment, and qualitative data help us understand how individuals are experiencing the process. In an experimental mixed methods design, the researcher can collect qualitative data, but the overall design still emphasizes quantitative approaches. In some fields new to qualitative research, this role of qualitative data helps to legitimize the use of such forms of data. One challenge in using such a design is to be clear about the intent of the secondary database. In addition, the two databases may not be easily compared because the data address different research questions. There is also the possibility that introducing qualitative data collection during an experiment will influence the outcomes. Strategies need to be put into place to minimize this effect (e.g., collecting qualitative data at the end of the experiment and having participants complete journals of their experience that are turned in after the experiment). Furthermore, like the convergent design, the simultaneous data collection of quantitative and qualitative data may be labor-intensive for a single researcher.

Kron et al. (2017) conducted a mixed methods randomized controlled trial of an educational intervention to train medical students on empathic communication. The authors assessed outcomes through quantitative measures of skills and process by gathering students' experiences with both the intervention and control conditions. The randomized controlled trial involved three university medical school sites in the United States with 210 students in the intervention and 211 in the control. The intervention consisted of virtual human-based training in which the student interacted with a lifelike computer-generated character to practice communicating with patients, families, and other providers. The control group was a computer-based module consisting of videos and narrated instruction. The main outcome measure was an unannounced simulated scenario about 1 week later with a trained actor called a standardized patient instructor that assessed communication skills on four domains: openness/defensiveness, collaborative/competitive, nonverbal communication, and presence. They found a statistically significant improvement in the intervention relative to the control group. Kron and colleagues (2017) integrated

qualitative observations of the learning experience and a student written reflection. For example, they merged student attitudes about the learning experience with qualitative reflections to understand more about the processes and experiences of students. In sum, they found that increased interaction promoted better student engagement in the intervention group, differences confirmed by both the quantitative and qualitative results.

The Social Justice Design

A **social justice design** is a mixed methods design in which a framework (e.g., feminist or ethnic) encases the convergent, explanatory, or exploratory sequential basic designs. It could be called a "transformative" design or a participatory design because the intent is to transform society and address the injustices that exist for certain populations. This is often done with the participation of marginalized groups in society and in communities. An added factor of this design is to bring about change, so the studies often end with specific "calls" for reforming society. A strength of this design is that it is value-based and ideological (Greene, 2007). The typical frameworks found in mixed methods are feminist, racial, ethnic, disability, and gay or lesbian perspectives. A challenge in using this design is that we are still learning about how to best integrate the framework into a mixed methods study.

A diagram of the procedures is found in Figure 16.4. For the purposes of discussion, this figure shows the use of a social justice framework within a basic explanatory sequential design (i.e., quantitative data collection followed by qualitative data collection). This design is characterized as follows:

- *The intent of this type of mixed methods design is to conduct a convergent, explanatory, or exploratory study within a framework aimed at addressing a social justice issue.* With social justice as a framework, the issue can flow into a mixed methods study at many and all phases of the research.
- *The mixed methods researcher uses either a convergent, explanatory sequential, or exploratory sequential design.* The basic designs provide the cornerstone for the social justice design, but this design goes beyond the simple use of the basic design.
- *The mixed methods researcher uses as an overall orientating lens in the study as a transformative framework. This framework may be a feminist perspective, a racial or ethnic perspective, or some other perspective.* It is this framework that shapes many aspects of the mixed methods design, such as the framing of the theory, the questions, the methods, and the conclusions. The framework basically addresses an issue for an underrepresented group and presents research intended to bring about change for that group.
- *The mixed methods researcher calls for change that will address the social issue faced by the group under study.* A strong key to a good social justice mixed methods study is whether the research calls for reform or changes at the end of the study. This call may be an explicit request for change or steps that will be required to bring about change.

In an explanatory sequential mixed methods study, Buck, Cook, Quigley, Eastwood, and Lucas (2009) used a feminist lens to study 89 African American girls' personal orientations toward learning science. The study begins with a theoretical framework about the writings of feminist researchers in science education and what it means to be a girl in science as well as an African American girl in science. In this sequential design, a quantitative first-phase study of the girls' attitudes toward science was collected on an inventory to provide descriptive results. This was followed by a qualitative second phase consisting of focus group interviews and themes related to the girls' definition of science,

understanding of the importance of science, and their experiences and success in school science. As a final step, the authors linked the qualitative themes to categories. In the article's conclusion, the authors call for reforming the instructional strategies in science for girls to positively connect with science, and they comment on how their study "illustrated the use of a feminist lens in a study in which specific myths have been dispelled and recommendations for change made" (p. 408).

Multistage Evaluation Design

Like the social justice design, the multistage design is a complex design that builds on the basic convergent, explanatory, and exploratory sequential designs. **Multistage evaluation designs** (called multistage designs) are mixed methods designs used when researchers seek to evaluate the impact of a program or project. This evaluation involves both formative and summative evaluation steps, and it consists of distinct stages in the research, beginning with a needs assessment, the development of a theory or conceptualization, the design of an instrument, and the test of a program. Often, the program is then revised in light of the formative and summative evaluation. This form of design is popular in large-scale health research and in program evaluation research. The stages may employ a combination of convergent or sequential individual studies that are combined to address a single, overriding program aim or objective. Challenges include forming a research team that can work comfortably together given diverse method orientations, making sure that the stages link together, and having all the studies provide insight into an overall project objective. As shown in Figure 16.4, the major elements of this design are the following:

- *The mixed methods researchers use either a convergent, explanatory, or exploratory design in multiple stages in the program implementation.* The multistage design builds on the basic mixed methods designs and adds to these designs multiple stages or projects conducted over time. Any one phase may include a combination of concurrent and sequential mixed methods designs. In addition, this form of research is most amenable to large-scale funded investigations.
- *The mixed methods researchers need to clearly identify stages that help address a larger program objective. These researchers also need experience in large-scale research.* Team members might include individuals with quantitative, qualitative, and mixed methods research skills.
- *The mixed methods researchers need to interrelate the different stages so that they tie together to address a common research objective.* Typically, one stage or project leads to another, and in this sense, the stages or projects build (or inform) on each other throughout the study.

In a multistage evaluation mixed methods study, Nastasi et al. (2007) provided a program development research study of culture-specific definitions of mental health constructs (e.g., stressors and competencies) for adolescents in Sri Lanka. This study was part of the Sri Lanka Mental Health Promotion Project. In the beginning of the article, we are introduced to 12 different phases in the research project that form formative research, instrument development, program development, and evaluation research. At these different phases, the researchers engaged in combinations of quantitative and qualitative research, with some phases presented as concurrent and some as sequential. A table in their article showed how they combined the qualitative and quantitative data in each stage (e.g., in the final evaluation stage, they combined qualitative and quantitative results based on an experimental design and post-intervention interviews). In this study, they used the basic mixed methods designs in different phases, conducted research toward the program objective of establishing a culturally relevant understanding

of mental health, and engaged in this large-scale investigation over several years involving at least six primary researchers.

When Maria starts with a survey and follows it up with an interview in her mixed methods study, what type of design did she use? What would be the possible intent of her design? What would be the reasons for using this type of design?

MyLab Education Self-Check 16.2

MyLab Education Application Exercise 16.1: Thinking Like a Researcher: Applying a Mixed Methods Design

WHAT ARE THE KEY CHARACTERISTICS OF MIXED METHODS DESIGNS?

Mixed methods designs can be distinguished from other types of designs in several ways. In reviewing the following eight characteristics, consider incorporating them into your plan for a study if you intend to conduct a mixed methods project. In addition, look for them in a mixed methods study you might be reviewing or reading:

- Collect and analyze quantitative and qualitative data
- Use rigorous methods
- Integrate the quantitative and qualitative data through merging, connecting, building, and embedding
- Use a specific mixed methods design
- Frame the study (often) within theory and philosophy
- Give priority to qualitative or quantitative data, or both
- Consider the sequence of qualitative and quantitative phases
- Diagram the procedures

Collect and Analyze Quantitative and Qualitative Data

In any mixed methods study, you should clearly indicate that you are collecting both quantitative and qualitative data. Methods of data collection are typically associated with either numbers or numeric data and words or text and image data. Mixed methods researchers collect both quantitative and qualitative data.

A broader picture of data forms is given in Table 16.1. In this table, the columns illustrate both methods and data. In practice, mixed methods researchers use different methods to collect different forms of data. In a mixed methods study, researchers include specific forms of both quantitative and qualitative data and incorporate this discussion into the methods or procedure section of the study.

Use Rigorous Methods

Good mixed methods studies incorporate rigorous methods of data collection, analysis, and interpretation for both the quantitative and the qualitative data. There is no reason to diminish the sophistication of either the quantitative or the qualitative methods because both are being used in a study. What constitutes "rigor"? Certainly, it may vary from one observer to another. But, as shown in Table 16.2, there are common features that need to be addressed whether the methods are quantitative or qualitative. These include data collection features of sampling, recruitment of participants, an adequate sample size, the identification of various forms of data collection (e.g., surveys, interviews), and ways to record the data and to transcribe or store them. It also includes the data analysis steps of

TABLE 16.1
Quantitative and Qualitative Methods of Data Collection and Types of Data

Quantitative Research		Qualitative Research	
Methods of Data Collection	Data	Methods of Data Collection	Data
Instruments (e.g., questionnaire, closed-ended interview, or closed-ended observation)	Numeric scores	Open-ended interviews	Text data from transcribed interviews
Documents (e.g., census or attendance records)	Numeric scores	Open-ended questions on questionnaires	Text data transcribed from questionnaires
		Open-ended observations	Field notes (text) from researcher's notes
		Documents (e.g., private or public)	Text data optically scanned from diaries, journals, letters, or official documents
		Visual materials	Image data from pictures, photography, or audio recordings

an initial review of the data and more advanced procedures of analysis. In some cases, participants in communities are involved in all (or many) aspects of the research process.

Integration (Combining the Databases)

Mixed methods research is not simply collecting and analyzing both quantitative and qualitative information. It goes beyond these steps to include the combining, integrating, or "mixing" of the two sets of data. There are several ways that the research could accomplish integration. It could occur by *merging* the two data sets, as is found in a

TABLE 16.2
Rigorous Quantitative and Qualitative Methods

	Quantitative Methods	Qualitative Methods
Sampling	Yes	Yes
Recruitment	Yes	Yes
Sample size	Yes	Yes
Forms of data collection	Yes	Yes
Methods for recording data	Yes	Yes
Methods for transcribing/storing data using software	Yes	Yes
Cleaning up the database	Yes	Yes
Initial analysis	Yes	Yes
Advanced analysis	Yes	Yes
Involvement of community stakeholders	Yes	Yes

convergent design. This merging can occur by comparing the results in a discussion or arraying the data in a table where, for example, the researcher may compare the qualitative themes with the statistical results. The databases can be mixed by *connecting* one to the other, as in an explanatory sequential design, or by having one *build* into the other, as in an exploratory sequential design. Finally, integration might occur when one database is *embedded* within another database, as in an experimental mixed methods design. Embedding draws on merging, building, and connecting, depending on the point of integration of qualitative and quantitative components in the study.

Researchers conducting mixed methods are increasingly using joint displays, which are visual representations of integration in mixed methods research (Guetterman, Creswell, & Fetters, 2015; Guetterman, Creswell, & Kuckartz, 2015). Visual joint displays have been linked to these types of integration and the mixed methods designs. In brief, a researcher might create a table to represent merging integration that juxtaposes qualitative findings with related quantitative results, and a mixed methods inference made from integrating the two. Alternatively, merging might be represented by relating themes and statistics, such as arraying themes as columns and statistics as rows. Connecting can be represented visually by showing how results were used systematically to inform the sampling or data collection instruments such as interview or focus group questions. When connecting, the most important consideration is how the qualitative follow-up can explain the quantitative results. To represent building integration, researchers have used joint displays to show how they systematically applied qualitative results (e.g., themes, codes, and quotes) to build a survey or other assessment instrument. Finally, researchers can represent embedding integration visually by showing any combination of merging, connecting, or building.

Use a Specific Mixed Methods Design

Another characteristic is that the researcher chooses a specific mixed methods design—basic or complex—to use. On what is this choice based? The first criterion would be the intent of the researcher (see the above description of designs). Is the intent to merge the data so that the qualitative and quantitative information can be compared? Is it to merge the data and place them within an experiment? The second criterion would be the researchers' familiarity with the designs and which one is most appealing. For individuals trained in quantitative research, the explanatory sequential design as a starting point is often appealing. For people skilled in qualitative research, the exploratory sequential design is frequently the design of choice. The third criterion is to select a design based on time and resources. A convergent design, for example, can be an efficient design in that both forms of data are roughly collected at one time, at one outing to the field. A complex experimental design, on the other hand, requires conducting an experiment and adding to it qualitative data collection and analysis. Involving community members in any of the designs requires still more time. The fourth criterion would be the types of mixed methods designs popular in the researcher's field. In some fields, an explanatory sequential design is the design of choice because it is popular for individuals adding qualitative data to existing quantitative instrument administration.

Frame the Study within Theory and Philosophy

The use of theories is popular in mixed methods research and can take the form of social science theories or more social justice theories. Social science theories would be like those of the Brady and O'Regan (2007) study, in which the authors used a mentoring theory to guide both their quantitative and their qualitative questions. A social justice theory might involve the feminist perspective, such as described in Buck et al. (2009). Furthermore, a mixed methods study might explicitly identify the worldview and philosophy the researcher

is using in a study. This worldview might present as pragmatism or one of the other worldviews mentioned earlier as the philosophical foundation for the mixed methods study. In addition to these major characteristics, several others hold important roles in mixed methods study. Priority, sequence, and the diagram of procedures are also briefly mentioned.

Give Priority to Either Quantitative or Qualitative Research or Both

Priority means that in a mixed methods design, the researcher places more emphasis on one type of data than on other types of data in the research and the written report. This emphasis may result from personal experience with data collection, the need to understand one form of data before proceeding to the next, or the audience reading the research. Whatever the reason, in examining a mixed methods study for priority, ask the following questions:

- What do you emphasize more in the purpose statement—exploration or prediction of outcomes?
- To which data collection process—quantitative or qualitative—do you give the most attention (e.g., number of pages in a report) in the "Methods" and "Results" sections?
- Which data collection process do you examine in the most depth (e.g., detailed statistical analysis or multiple-layered thematic analysis)?

Sequence the Quantitative and Qualitative Methods

Mixed methods researchers advance the **sequence** of data collection using concurrent or sequential approaches or some combination. Again, several options exist for the sequencing of data collection:

- You collect both quantitative and qualitative data at the same time.
- You collect quantitative data first, followed by qualitative data.
- You collect qualitative data first, followed by quantitative data.
- You collect both quantitative and qualitative at the same time, and you also collect it in sequence.

If the purpose of the study is to explain quantitative results further with qualitative data (i.e., explanatory sequential design) or to develop an instrument from qualitative data (i.e., exploratory sequential design), the procedures should clearly indicate this sequence. The data collection procedures are independent of each other and typically presented as phases. If the intent of the study is to converge the findings (i.e., convergent design), then the data are collected at the same time, and the researcher is explicit about the process. This process involves two data collection efforts that proceed simultaneously and are related to each other. Some mixed methods studies involve both the concurrent and the sequential processes of data collection.

Diagram the Procedures

Mixed methods researchers often provide a **visualization** or diagram of their design depicting the procedures. A visualization is a figure, such as the examples in Figures 16.3 and 16.4, that indicates the process of data collection, analysis, and interpretation. It consists of labeling the quantitative and qualitative data and indicating the sequence of activities (using arrows or plus signs). By including this diagram, the researcher helps readers identify the sequence of data collection, an important aid when collecting multiple forms of data. The notation system by Morse (1991), described in Figure 16.1, can be useful in developing this visualization.

MyLab Education Self-Check 16.3

MyLab Education Application Exercise 16.2: Thinking Like a Researcher: Designing a Mixed Methods Study

WHAT ARE SOME POTENTIAL ETHICAL ISSUES IN MIXED METHODS RESEARCH?

Substantive discussions about the ethical issues that arise in mixed methods research have not yet taken place, but the conversation has certainly begun, with Mertens, Holmes, and Harris (2009) addressing transformative (e.g., social justice) research and ethics. Thus, these authors suggest that the transformative approach is a site of multiple interpretive practices and that ethical considerations occur at multiple points in the research process. The sampling in a mixed methods transformative design needs to consider the dangers of grouping all participants together in a general category that may stereotype them. The data collection should not further marginalize groups of participants, and the data decisions need to benefit the community members involved while remaining aware of the cultural issues at play. The data findings need to be linked to social action.

Since mixed methods research combines quantitative and qualitative research, ethical considerations need to attend to typical issues that surface in both forms of inquiry. Quantitative issues relate to obtaining permissions, protecting the anonymity of respondents, not disrupting sites, and communicating the purposes of the study. In qualitative research, ethical issues relate to conveying the purpose of the study, avoiding deceptive practices, respecting vulnerable populations, being aware of potential power issues in data collection, respecting indigenous cultures, not disclosing sensitive information, and masking the identities of participants. In mixed methods basic designs, some ethical and methodological issues may arise that are unique to each type of design:

- In a convergent design, the quantitative and qualitative sample sizes may be different. Care needs to be taken to not minimize the importance of a sample because of its size.
- In an explanatory sequential design, researchers may use a large quantitative database for the initial phase of the research. In order to follow up on these individuals with qualitative interviews, there needs to be an identifier linked to the quantitative database. Some individuals may not want their quantitative data released. Using names without permission constitutes an ethical mixed methods issue.
- In an experimental design, conducting initial qualitative interviews to build an intervention before an experiment may be helpful in designing the intervention. However, using the initial interview data to place participants in a control group where they do not receive a beneficial treatment presents an ethical issue. Furthermore, collecting qualitative interviews while the experiment is proceeding may influence the scores on important outcome variables at the end of the experiment.
- In a social justice design, the following ethical issues can surface: the qualitative data influencing the outcomes and treating the participants fairly so they do not become further marginalized during the study.
- In a multistage design, ethical issues arise when the needs of participants are overlooked in favor of existing models in the literature and when a new stage is developed that does not build on the prior stage or contribute to the overall project objectives.

"Ethical Dilemma: When Mixed Methods Researchers Do Not Seek Ongoing Permission" suggests another issue that may arise during a multiphase design.

: a Researcher: Designing a Mixed Methods

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Ethical Dilemma

When Mixed Methods Researchers Do Not Seek Ongoing Permission in a Multiphase Project

An educational researcher is overseeing a funded project to study the oral traditions of language use among the Cherokee Indian Nation. This researcher decides to collect both quantitative data in the form of surveys and qualitative data in several focus groups with members of the Cherokee tribe. The survey and the focus groups will occur over several years, and when the researcher first designed the project, permissions were sought from tribal leaders about when the data could be collected and how they were to be used (for research purposes). As the project unfolds, the researcher begins to take some findings on the topic of American Indians into his college classroom and use these data in discussing the needs of tribes today. This raises the following questions: Is such a practice ethical? How might this researcher/teacher obtain permission to use the data for classroom purposes? Claiming that the researcher has engaged in an unethical practice, the Cherokee Nation now wants a certain percentage of the monies raised to fund the project. Should it receive some of these monies?

MyLab Education Self-Check 16.4

MyLab Education Application Exercise 16.3: Thinking Like a Researcher: Ethics and Mixed Methods Research

WHAT ARE THE STEPS IN CONDUCTING A MIXED METHODS STUDY?

Now that you have a basic understanding of mixed methods research, we can turn to specific steps typically undertaken by researchers when they use this design. These steps are not lockstep procedures; they provide a general guide to help you get started. See Figure 16.5 for an overview of this process.

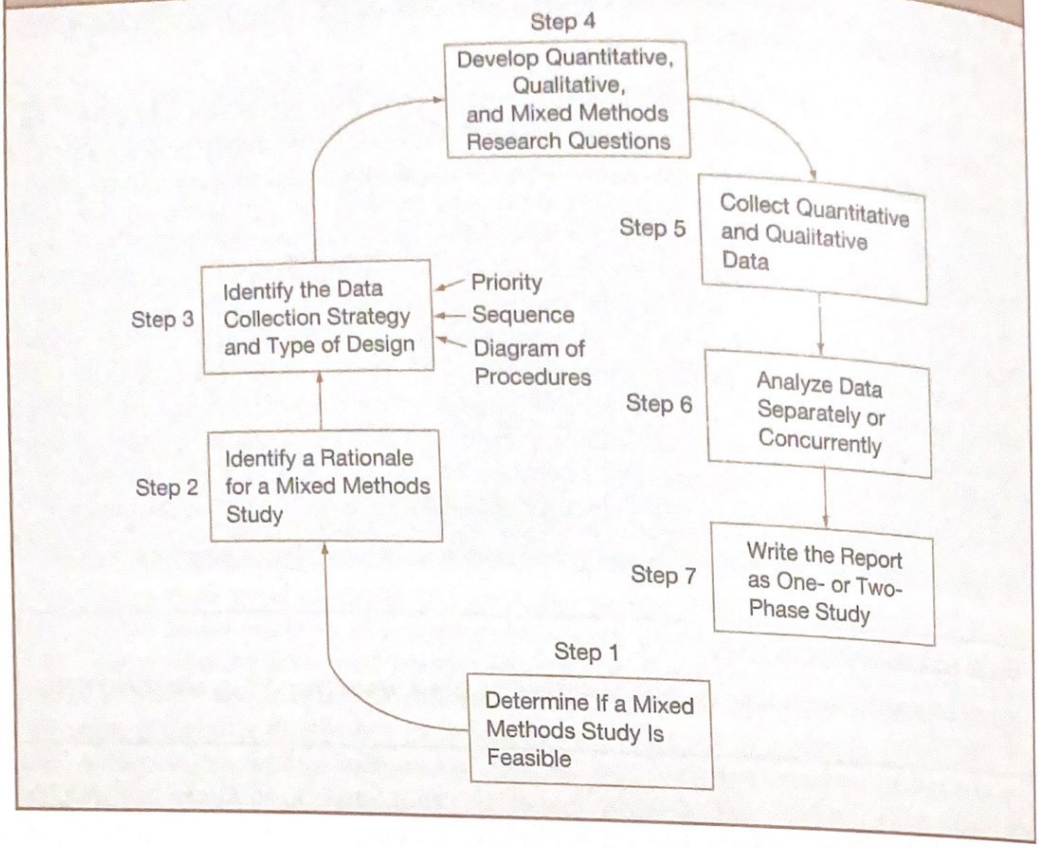
Step 1. Determine If a Mixed Methods Study Is Feasible

The first step in the process is to assess the feasibility of using this design. You need skills in gathering both quantitative and qualitative data, time to collect extensive information, and a working knowledge of the different types of designs. Also important is whether audiences such as graduate committees, publishers, other researchers, and practitioners in educational settings will appreciate the complexity of your mixed methods study.

Step 2. Identify a Rationale for Mixing Methods

Assuming that a study is feasible, you need to consider why you are collecting both quantitative and qualitative data. The intent for the six basic and advanced designs should provide a good starting point. Be explicit in this rationale and include it early in your research plan or report. See the intent statements for each design advanced earlier in this chapter.

FIGURE 16.5
Steps in the Process of Conducting a Mixed Methods Study



Step 3. Identify a Data Collection Strategy

Identifying your mixed methods intent for the study will lead to planning your procedures for collecting data. You need to know the following:

- The specific forms of quantitative data (e.g., attendance records) and qualitative data (e.g., pictures) you will collect
- The priority you will give to quantitative and qualitative data
- The sequence of your data collection if you do not plan to collect the data concurrently

Once you have made these decisions, create a diagram of the procedures and use the models shown in Figures 16.3 and 16.4 to help you create this diagram.

Step 4. Develop Quantitative, Qualitative, and Mixed Methods Questions

With the specific design in mind, next develop your research questions. Depending on the type of design, you can identify these questions prior to a study, or they may emerge during the study. For example, in a two-phase design, the questions for your second phase cannot be specifically identified early in the study—they will emerge as the study progresses. Alternatively, for a convergent design, you can present the questions before data collection and specify them in detail.

If you can identify both quantitative and qualitative questions, pose both sets of questions (for institutional review boards, create tentative questions). Typically, researchers

present both exploratory questions (i.e., qualitative) and analytic, variable-oriented questions (i.e., quantitative) in a mixed methods study. Quantitative questions specify the relationship among independent and dependent variables. They may be written in the null form but are typically written to convey an alternative directional form (e.g., the more mentoring, the greater the self-esteem of students). Qualitative questions are open-ended and nondirectional in nature and seek to describe the phenomenon.

In addition, you might consider posing a mixed methods question. Most researchers are not familiar with this type of question. It is essentially a question that is to be answered by the mixed methods research design being used. For example, in a convergent design, the mixed methods question could be "Do the two databases (quantitative and qualitative) converge and present consistent findings or diverge and show contradictory findings?" For an explanatory sequential design, we might ask, "How does the qualitative follow-up data help us to better understand the quantitative first-phase results?" For an exploratory sequential design, the question might be "Is the instrument we develop in the second phase (as a result of exploring in the first phase) a better instrument than those available to measure the variables?" For an experimental design, the question might be "How do the qualitative findings provide support and enhanced understanding for the quantitative results?" For a social justice design, the question might be "How can the social issue be better addressed using results from both quantitative and qualitative findings?" A multistage design would address the question "How do the stages of the evaluation contribute to the overall project aim?"

Step 5. Collect Quantitative and Qualitative Data

Collecting data in a mixed methods study follows rigorous quantitative procedures and qualitative procedures. For a mixed methods study, the sequence in which you collect the data will depend on the type of design. However, in all designs, this phase of the research will be lengthy and require good organization of the information. Statistical programs and text analysis programs can provide useful systems for storing, managing, and recording the data.

Step 6. Analyze Data Separately, Concurrently, or Both

The data analysis will also relate to the specific type of mixed methods design you are using. You can analyze quantitative data separately from qualitative data, as in the explanatory and exploratory sequential designs, or integrate the data analysis, as in the convergent design.

Step 7. Write the Report as a One- or Two-Phase Study or a Multiple-Stage Study

The final step in a mixed methods study is to write a scholarly report of the project. Some variations are seen in the writing structure of mixed methods studies, as outlined here:

- *The report is written in two phases.* The report contains one section to specify the problem and the literature. Then, sections follow on data collection, analysis, and interpretation. Each of those contains subsections—one quantitative and one qualitative. For example, the data collection section will have a subsection on the quantitative phase and on the qualitative phase, following the order of the research. That structure repeats for the analysis and interpretation sections.
- *The report integrates the quantitative and qualitative phases of the study in each section.* The problem statement, for example, contains both the need to predict or