A Concise Introduction to

MIXED METHODS RESEARCH

SECOND EDITION

John W. Creswell

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Second Edition

This book is dedicated to Isabel Bickett Marshall (1914–2014), who raised me as a child, and who provided love, support, and a heightened sense of organization to my life and for my professional work.

—JWC

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Preface

I assume that in reading this book, you are interested in exploring or maybe conducting mixed methods research. Also, I assume that you probably have a research problem or question that can be best answered by collecting and analyzing both quantitative (e.g., survey) and qualitative (e.g., interview) data. Did you know that bringing the two together (e.g., mixing) adds value to a study and enables you to understand your problem and questions better than simply reporting survey results and interview results separately? When you bring them together, then, how will you combine the two databases when one consists of numbers (survey data) and the other, words (interview data)? How can your study be presented as a good research project? Welcome to this book! You will learn how to bring the two together and, moreover, frame your "mixing" of methods in a rigorous, systematic way for publication and potential funding. This book will provide an introduction to mixed methods research.

PURPOSE OF THE BOOK

The idea for this book originated in a class I taught at Harvard's School of Public Health and the School of Medicine in 2014. I fortunately had the opportunity to teach a master class to graduate students and faculty. The topics of mixed methods and the content from my PowerPoint slides in that class informed the development of this book. I soon began writing this book after my semester-long class ended. Also, the content for this book has been shaped from my numerous workshops over the past 20 years both in the United States and abroad. These workshops have been largely aimed at beginning mixed methods researchers—graduate students seeking to develop a thesis or dissertation using mixed methods, or faculty or researchers designing proposals for funding containing this methodology. The approach I have taken has been to invite participants to bring a mixed methods project they would like to work on during the workshop. This approach has seemed to work well, but I have often thought that our work together would be enhanced if participants had some background in mixed methods to build on. I felt that an introductory text that would be easy and quick to read by participants prior to enrolling in the workshop would provide a useful foundation for the content I planned to provide in our session. Unfortunately, although there are over 30 books devoted primarily or exclusively to mixed methods (Onwuegbuzie, 2012), many are long treatises on the subject—including the one I coauthored with Vicki Plano Clark (Creswell & Plano Clark, 2018), which stretches for 347 pages. Many workshop participants, including busy health providers, simply did not have time to read these long

books or even to devote time to finding and reading shorter chapters on mixed methods in research methods books. Thus, you have with this concise book an introduction that takes only about 2 to 3 hours to read. The main purpose of this book is to provide an overview and introduction to mixed methods research and to take the reader through the essential steps in planning or designing a study. It should, however, provide a foundation for understanding the methodology based on the latest advances in the field.

AUDIENCE

This concise introduction to mixed methods research is geared toward the beginner in mixed methods or the more advanced researcher who needs a quick refresher on this approach to research. It provides this introduction to individuals in the social, behavioral, and health sciences in the United States, as well as to researchers on many continents around the globe.

FEATURES OF THIS CONCISE BOOK

This book contains several features to facilitate easy reading: The chapters are short, references and illustrations are kept to a minimum so as not to distract from the flow of the text, additional resources are listed at the end of each chapter, and a short glossary of key terms ends the book so that the reader can quickly grasp the language of this methodology. Many of the ideas presented in this book draw on my current research methods books from SAGE Publications and from Pearson Education.

CHAPTERS IN THE BOOK

Chapter 1 begins with a definition of what is and what is not mixed methods research. This is followed by the identification of the essential characteristics of this methodology. Chapter 2 reviews the essential skills needed for this form of inquiry. Unquestionably, to conduct a mixed methods study requires skills in both quantitative and qualitative research as well as mixed methods research. It also requires gaining these skills through research experiences and developing an open attitude toward using diverse methodologies. Sometimes a mixed methods study is conducted by a researcher working alone; at other times, the researcher joins a team. Chapter 3 identifies several steps in designing a mixed methods project that I use when students and faculty appear in my office wanting to conduct a mixed methods study. I take the reader through seven basic steps. In Chapter 4, I discuss how to introduce a mixed methods study in its opening passages, including initial ideas such as the purpose statement or study aims and the research questions. Chapter 5 begins the discussion about types of mixed

methods designs or procedures. This chapter introduces the core designs in a project: the convergent design, the explanatory sequential design, and the exploratory sequential design. I then discuss the criteria for choosing a core design for a project. Chapter 6 takes the design discussion to the next step. In this chapter, I introduce the embedding of the core designs of Chapter 5 into a complex design consisting of frameworks or processes. Specifically, I discuss four types of complex designs: embedding core designs into experiments, participatory action research studies, multiple case studies, and evaluation projects. Chapter 7 follows up on this discussion by focusing on how to draw a diagram of procedures for both core and complex designs. Chapter 8 goes into more details about the procedures. Specifically, I discuss the issues of sampling, the use of integration, and the development of metainferences from the integration. In Chapter 9, I examine the final phase of a project—the writing up of the study. This involves incorporating key elements of mixed methods in a study, structuring the article to relate to a specific type of mixed methods design, deciding on the type of mixed methods study to write, and, finally, locating a suitable journal for publication. Once the entire process of mixed methods is completed, researchers should look over their study to determine if it is of high quality. In Chapter 10, I discuss locating standards of quality, determining if the standards are appropriate to use, examining the literature for published standards, and then reflecting on my standards that incorporate many features of this book.

NEW FEATURES IN THIS SECOND EDITION

Since I wrote the first edition of this book in 2015, the field of mixed methods has changed considerably. Not only have extensive empirical journal articles appeared in the literature, but also new content has emerged to help define the field and advance it as a methodology. The changes reflected in this second edition speak to these developments. They are as follows:

1. The structure of the book has changed. I eliminated Chapter 10 in the first edition and developed a short section on the development of the field in Chapter 1. I then reordered the chapters to better fit the process of research from an introduction; to designs; to procedures of sampling, integration, and metainferences; and on to writing a study and evaluating its quality.
2. New tables and figures have been inserted to cover content not addressed in the first edition. I added, for example, the skills needed by a mixed methods researcher, the flow of philosophy to specific procedures, a comparison of quantitative and qualitative questions, joint displays, tips on writing and publishing a mixed methods study, and my own quality standards that I recommend for mixed methods research.

3. Useful templates have also been added to this edition. These templates allow the reader to insert content into a format so a good example can be constructed immediately, such as a scholarly title to a project.
4. An updated discussion about research designs is found in this new edition. I now convey two broad categories of designs: core designs and complex designs. With these design changes also come revisions in this edition about how to draw the designs, especially the complex designs that are often complicated to portray.
5. In the first edition, one chapter focused on sampling and integration. In this edition, I expanded the discussion about integration and added a third element—metainferences—which presents the insights to be gained in a study from the integration of quantitative and qualitative data. Metainferences need to be seen as a major component of mixed methods research.
6. As with all of my new editions, this book will include up-to-date references and recent commentary and advances in the field of mixed methods.
7. Recent developments in assessing the quality of a mixed methods study, as found in standards presented by the American Psychological Association and the U.S. National Institutes of Health, are highlighted in this second edition, as well as recent journal publications on quality.

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About the Author

John W. Creswell, PhD, is a professor of family medicine and senior research scientist at the Michigan Mixed Methods Program at the University of Michigan. He has authored numerous articles and 30 books on mixed methods research, qualitative research, and research design. While at the University of Nebraska–Lincoln, he held the Clifton Endowed Professor Chair, served as director of the Mixed Methods Research Office, founded SAGE's *Journal of Mixed Methods Research*, and was an adjunct professor of family medicine at the University of Michigan and a consultant to the Veterans Administration health services research center in Ann Arbor, Michigan. He was a Senior Fulbright Scholar to South Africa in 2008 and to Thailand in 2012. In 2011, he co-led a National Institutes of Health working group on the "best practices of mixed methods research in the health sciences" and in 2014 served as a visiting professor at Harvard's School of Public Health. In 2014, he was the founding president of the Mixed Methods International Research Association. In 2015, he joined the staff of Family Medicine at the University of Michigan to co-direct the Michigan Mixed Methods Program. In 2016, he received an honorary doctorate from the University of Pretoria, South Africa. In 2017, he coauthored the American Psychological Association "standards" on qualitative and mixed methods research. In 2018, his book on *Qualitative Inquiry and Research Design* (with Cheryl Poth) won the Textbook and Academic Author's 2018 McGuffey Longevity Award in the United States. He currently makes his home in Ashiya, Japan, and Honolulu, Hawaii.

Basic Characteristics of Mixed Methods Research

1

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How is mixed methods research defined?
- What is not mixed methods research?
- What are the six essential characteristics of mixed methods research?

UNDERSTANDING MIXED METHODS RESEARCH

The best way to begin a mixed methods project, I believe, is to have an understanding of the basic characteristics of mixed methods research. As a field of **methodology**, about 30 years old, there is today a general understanding as to the common characteristics of this approach to research. It has been described as a third methodology that sits between quantitative and qualitative research (Teddlie & Tashakkori, 2009). However, the perspectives about this methodology differ, such as it being viewed from more of a philosophical or theoretical approach (Greene, 2007), to a methodology orientation, focused on the phases of the research process (Teddlie & Tashakkori, 2009), to a transformative perspective to bring about change in communities or among groups (Mertens, 2009). These are all ways to look at mixed methods research; however, my particular stance is to view it as a method with a focus on the data collection, analysis, and interpretation in response to research questions. I was originally trained as a quantitative researcher in the early 1970s, expanded my interest to qualitative research in the 1980s, and began writing about mixed methods in the 1990s. My roots of training in quantitative and qualitative research have focused my attention on having rigorous methods of data collection and analysis. Consequently, as I define mixed methods, I will begin with my orientation toward it as a method, recognizing that alternative perspectives of it exist and are legitimate.

A DEFINITION OF MIXED METHODS RESEARCH

Given this perspective, I see **mixed methods research** as follows:

> A methodology and method to research in the social, behavioral, and health sciences in which the investigator gathers both quantitative (closed-ended) and qualitative (open-ended) data, integrates or combines the two, and then draws inferences (called "metainferences") from the integration that provides insight beyond what can be learned from the quantitative or qualitative data.

A core assumption of this approach is that when an investigator combines both statistical trends (**quantitative data**) with stories and personal experiences (**qualitative data**), this collective strength provides a better understanding of the research problem than either types of data alone. Further, my stance is to give equal value to both qualitative and quantitative research and to not privilege one or the other in conducting a mixed methods study.

As seen in Table 1.1, there are both advantages and challenges of using mixed methods in a study. Individuals undertaking mixed methods research for the first time should be aware of these factors because they may be challenged by reviewers. Like any methodology used in research, there are both strengths and challenges in using mixed methods.

TABLE 1.1

The Advantages and Challenges of Conducting Mixed Methods Research

Advantages	Challenges
Presents the use of a relatively new methodology	Requires skills in both quantitative and qualitative research
Involves a complex and sophisticated methodology using both quantitative and qualitative data	Requires additional skills in mixed methods research
Affords the ability to draw insights beyond the quantitative and qualitative data analysis	Involves extensive time and resources to collect and analyze both qualitative and quantitative data
Opens the possibility of multiple publications (e.g., a quantitative paper, a qualitative paper, a mixed methods paper)	Places a demand on the researcher to often educate reviewers about the essential characteristics of mixed methods research

WHAT MIXED METHODS IS NOT

Given this definition, it is helpful to identify what mixed methods is not and to set aside misconceptions that researchers often hold about this approach:

1. Mixed methods is not simply the gathering of both quantitative and qualitative data. Although this form of research is helpful, it does not speak to the true insight that can be gained from integrating or combining the two databases.
2. Mixed methods research is not simply a label that a researcher can assign to their methodology. Mixed methods research has distinct approaches about designs and procedures for conducting research, integrating the data, and drawing conclusions or inferences, to mention just a few of its procedures. It is a stand-alone methodology in its own right.
3. Mixed methods should not be confused with mixed model research, a quantitative approach in which investigators conduct statistical analysis of fixed and random effects in a database.
4. Mixed methods is not simply an evaluation technique, such as formative and summative evaluation, although researchers can employ the collection, analysis, and integration of data within an evaluation. Later I will comment in detail on this use as one of the complex mixed methods designs (see Chapter 6).
5. Mixed methods is not simply the addition of qualitative data to a quantitative design. Later I will talk about intervention mixed methods designs in which investigators do add qualitative data into an experimental trial (see Chapter 6). However, this addition should not be seen as minimizing the equal importance of qualitative data or viewing the qualitative data as playing a supportive or secondary role.
6. Mixed methods is not content analysis (Krippendorff, 2004), in which a researcher collects qualitative data (typically interview data) and then analyzes them quantitatively (i.e., scores, categories). Mixed methods research clearly involves collecting *both* quantitative and qualitative data because each form of data offers different perspectives from participants.
7. Mixed methods is not simply the collection of multiple forms of qualitative data (e.g., interviews and observations) or the collection of multiple types of quantitative data (e.g., survey data, experimental data). It involves the collection, analysis, and integration of *both* quantitative and qualitative data. In this way, the value of the different approaches to research (e.g., the trends as well as the stories

and personal experiences) can contribute to understanding a research problem. When multiple forms of qualitative data (or multiple forms of quantitative data) are collected, the term is *multimethod* research, not mixed methods research.

ESSENTIAL CHARACTERISTICS OF MIXED METHODS RESEARCH

Here are six essential characteristics I have used over the years to further define mixed methods research:

- Collect and analyze quantitative and qualitative data in response to research questions
- Use rigorous qualitative and quantitative methods
- Incorporate procedures within a mixed methods design
- Integrate qualitative and quantitative data in the design
- Draw metainferences from this integration
- Include a worldview and a theory

In the remainder of this chapter, I will address each essential characteristic in greater detail.

Collect and Analyze Quantitative and Qualitative Data

I start with the assumption that the two types of data differ and take different but equally important roles. Quantitative data collection relies on the researcher making decisions about what data to collect (e.g., what variables to measure, what instruments to use). Alternatively, qualitative research is based on participant decisions where data collection involves asking open-ended, general questions and allowing individuals to formulate responses.

A researcher using *quantitative* methods decides what to study, poses specific questions or hypotheses, measures variables to facilitate the assessment of answers, uses statistical analysis to obtain information in order to answer the questions/hypotheses, and makes an interpretation of the results. This form of research is quite different from *qualitative* research, in which the investigator poses general questions and collects data in the form of text, audio recordings, or video recordings. A hallmark of qualitative research is that the researcher collects data by observing participants or directly asking them open-ended questions using tools such as interviews, focus group protocols, or questionnaires. After collecting qualitative data, the researcher conducts a thematic analysis and presents the findings in literary form, such as a story or narrative. Thus, both qualitative

and quantitative research follow the general process of research: identify a problem, determine research questions, collect data, analyze data, and interpret results. However, the means of carrying out each of these stages differs considerably between the two methods.

Elements of both quantitative and qualitative research are included in a mixed methods study. It becomes important, then, to realize that a mixed methods researcher needs to be skilled in both quantitative and qualitative approaches. Furthermore, to make the most of a mixed methods design, investigators need to understand the advantages and the disadvantages that accrue from both quantitative and qualitative research. See Table 1.2 for a brief comparison of the two approaches.

Use Rigorous Quantitative and Qualitative Methods

Although both quantitative and qualitative research flow into a mixed methods study, this does not mean that the scope of each approach will be reduced. Over the years, several authors have advanced criteria for what constitutes rigorous research from either a quantitative or qualitative perspective. We need to pay attention to these guidelines, whether they are the CONSORT quantitative randomized trial checklist (Schulz, Altman, & Moher, 2010) or the American Psychological Association standards, the Journal Article Reporting Standards (JARS)–Quant (Appelbaum et al., 2018), or the JARS–Qual (Levitt et al., 2018). In general, rigor occurs when the researcher incorporates elements such as the following:

- Type of research design used (e.g., experiment, ethnography)
- Permissions for gaining access to the site and adequate recruitment procedures
- Sampling approach (systematic vs. purposeful)
- Number of participants
- Types of data to be collected (e.g., text, audio and video recordings, test score, questionnaire responses)
- Instruments used to collect the data (e.g., surveys, observational checklists, open-ended interviews, focus group protocols)
- Organization and cleaning of the database as the first step in data analysis
- Later data analysis procedures, ranging from basic to more sophisticated approaches (e.g., descriptive to inferential, coding to theme development)
- Approaches to establish the validity and reliability of the data (e.g., quantitative internal validity, qualitative validation strategies)

TABLE 1.2

Advantages and Limitations of Qualitative and Quantitative Research

Qualitative Research	
Advantages	**Disadvantages**
Focuses on the views of participants, not the researcher Provides detailed perspectives of a few people Captures the voices of participants Allows participants' experiences to be understood in context Appeals to people's enjoyment of stories	Limits drawing generalizations Provides only soft data (not hard data, such as numbers) Studies few people Uses highly subjective interpretation Minimizes use of the researcher's expertise due to reliance on participants
Quantitative Research	
Advantages	**Disadvantages**
Relies on many researcher decisions Draws conclusions from large numbers of people Analyzes data efficiently Investigates relationships within the data Examines probable causes and effects Controls for bias Appeals to people's preference for numbers	Presents often dry, impersonal accounts Limits gathering the actual words of participants Provides limited understanding of the setting or context of participants Relies too much on the researcher's decisions

Incorporate Procedures Within a Mixed Methods Design

Mixed methods research consists of not only collecting and analyzing quantitative and qualitative data but also linking or integrating the two databases in a specific design or set of procedures. Over the years, various authors have advanced many different types of designs with a diverse set of names. In our writings (Creswell & Plano Clark, 2018), we have taken the stance that this diversity creates confusion, especially for beginning researchers, and that it would be most helpful to have a smaller set of designs and allow researchers to adjust

or modify these basic or core designs to fit their particular study. Further, the designs, it should be noted, can be preplanned before a study begins or emerge as the study proceeds.

Here I will briefly introduce the two categories of designs and then in Chapters 5 and 6 go into the designs in more detail. First, we have **core designs in mixed methods research** that represent bringing together the quantitative and qualitative data. The three core designs are popular in mixed methods research, and one or more of them are included in all mixed methods studies.

The three core mixed methods designs are as follows:

- In a **convergent design,** the researcher compares results from the quantitative and qualitative data analysis. The researcher collects both quantitative and qualitative data, analyzes both data sets, and then *compares* the results by *merging* or placing the two databases side by side to see how the results confirm a common understanding or present a divergence of findings. This is the intent of this design. Sometimes this design involves changing or transforming—**data transformation**—the qualitative data into scores or measures and combining this transformed information with the quantitative database. In this case, rather than a comparison of results, the researcher seeks to combine the results.
- In an **explanatory sequential design,** the researcher connects the quantitative and qualitative data by having one database build on the other. The procedure is to first collect quantitative data and then to follow-up with qualitative data to *explain* from personal experiences the quantitative results in more detail. Explanations may help to understand unusual or surprising quantitative responses or to understand the quantitative statistical results in more detail.
- In an **exploratory sequential design**, the researcher plans to develop quantitative measures or assessments that capture the culture and understandings of the participants being studied. The procedure involves building this understanding by first collecting qualitative data, designing or adjusting the measures or assessments to fit the culture or population under study based on the initial qualitative data, and then administering the culturally sensitive quantitative measure or assessment. This procedure can be used, for example, to develop a culturally sensitive survey instrument or experimental or intervention activities.

After using these core designs for several years, I (and my colleague, Plano Clark, and others) found that these core designs were being used in processes or procedures that went beyond the designs of simply combining the qualitative and quantitative data. We found that the core designs were being used by

researchers in more complicated procedures or processes. For example, evaluation projects have multiple phases in which both quantitative and qualitative data can be collected at different phases. In experiments (or interventions, which are hereafter called experiments), the combination of both qualitative data and the quantitative trial involved adding core designs at different stages of the study. Consequently, we began to consider additional designs than the three core designs and have called them "advanced" designs (Plano Clark & Ivankova, 2016), "scaffold" designs (Fetters, 2020), or "complex" designs (Creswell & Plano Clark, 2018). In this book, I will use the term **complex mixed methods research designs** because I feel that it best captures the idea that core designs are embedded within a complex framework or process. Here are four examples of complex designs that include one or more core designs:

- **Mixed methods experimental (or intervention) designs** are those in which the researchers add one or more core designs into an experiment. This is accomplished by combining qualitative data with the quantitative experiment or trial. The qualitative data can be added in before the trial, during the trial, after the trial, or some combination of these times during a trial. Adding data in this case consists of *embedding* the qualitative data within a quantitative experimental trial.

- **Mixed methods participatory action research designs** are those in which the researcher adds one or more core designs into an overall social justice or participatory action research process. The quantitative and qualitative data (and their combination) flow into the framework at different points, but the participatory framework becomes a constant focus of the study aimed at improving the lives of individuals or communities in our society today (e.g., a feminist social justice design). Databases added in this type of design involve *threading* the core designs into the social justice or participatory framework throughout the study.

- **Mixed methods multiple case study designs** are designs that include one or more of the core designs in a study with the intent to develop a case or multiple cases, document or provide evidence for a case or cases, and then, in multiple case studies, conduct a cross-case analysis of the cases. Thus, cases can be deductively tested or inductively derived. The core designs contribute to *identifying* or *testing* cases.

- **Mixed methods evaluation designs** are designs that include one or more core designs within the stages or phases of an evaluation process. Evaluations have known stages or phases that researchers use, such as a needs assessment, the development of measures for assessing a program, the design of a program, and follow-up analyses to determine

if the program works. At one or more of these stages or phases, the researcher collects and combines quantitative and qualitative data. Thus, the core designs are *embedded* into the evaluation process.

Integrate Qualitative and Quantitative Data

Over the years, the topic of how to integrate the quantitative and qualitative data in core and complex designs has baffled researchers. Undoubtedly at the heart of this controversy lies an awkwardness of combining or bringing together numeric data (i.e., close-ended) with text data (i.e., open-ended). Prior to the advent of mixed methods, the databases were mostly kept separate in studies. However, mixed methods researchers have seen the additional insight that results from the integration of the two databases.

Integration is the process in which the researcher brings the quantitative and qualitative databases together. It represents the centerpiece of good mixed methods research and enables a researcher to draw further insight from data beyond the qualitative findings and the quantitative results. This integration process differs depending on the type of mixed methods design used in a study, and thus it varies in procedures. I think about integration in terms of its intent and the process for assessing it. First look at the **integration intent** (or justification) for collecting and analyzing both forms of data within a design. For a convergent design, for example, the reason lies in comparing the two databases so that a comparison of them can be made. In Chapter 8, I will discuss the *integrative* intent for the major core and complex designs. Second, consider the **integration procedures**. The procedures can take several forms: merging, explaining, building, and embedding, depending on the type of design. Also, these procedures are best conducted using a visual display, a table to co-present the quantitative and qualitative data, called a *joint display,* which will be further detailed in Chapter 8. In this sense, integration represents *mixed methods data analysis* and the way to analyze the combination, the "mixing" or the integration of the databases.

Draw Metainferences From Integration

In mixed methods research, the investigator collects and analyzes both qualitative and quantitative data, identifies a design, and then integrates the databases within the design. One more step is required: The researcher needs to closely inspect the results of the integration and draw inferences (or conclusions, interpretations, or insight) from the integration. This is known as drawing metainferences (Fetters, 2020). It is called "meta" inferences because in a mixed methods study, the researcher draws inferences not only from the quantitative results and the qualitative findings, but also from the integration analysis. Metainferences thus provide a broader integration beyond the qualitative and quantitative databases. These metainferences can be identified in a separate column in a joint display table or discussed in the results section

in a mixed methods article. Basically, they consist of concluding information about the relationship between the two types of data and suggesting how these relationships relate to existing literature or to known theories or conceptual frameworks. Chapter 8 will go into more details about drawing metainferences in mixed methods research.

Include a Worldview and a Theory

The final characteristic I would add would be to consider incorporating a worldview and a theory in a mixed methods study (see additional thoughts in Chapter 3). Both of these elements hover at the abstract level above the procedures. The first, the worldview, is the perspective that the researcher brings to a study, while a theory (or conceptual framework) represents a larger explanation from the literature typically based on the thinking of other researchers.

Worldviews go by different names in the literature: Sometimes they are called "paradigms" or "philosophical assumptions." They are the beliefs and values (Guba, 1990) that a researcher brings to a study that informs the types of problems studied, the methods used to study the problem, and the important significant results. Examples of these beliefs would be whether a researcher sees an important objectivity that explains what participants say (called **ontology**), describes how we know something exists (called **epistemology**), places importance on the researchers' values and bias (called **axiology**), the types of procedures used in a study (called **methodology**), or how the study needs to be written (called **rhetorical assumptions**) (Creswell & Creswell, 2018). Being specific about a worldview is important because we all bring assumptions to our research, and it lets readers know the stance of the investigator. In mixed methods research, a popular worldview is **pragmatism**. This is an American philosophy focusing on the importance of the research question, collecting multiple forms of data to address the question, and applying the findings in a "real-world" practical way.

Theories (or conceptual frameworks) are also important to use in mixed methods research. They are sometimes called "theoretical rationales" in studies. They help a researcher predict or explain findings in a study. A theory in quantitative research is an explanation as to what the researcher expects to find. This theory can be used to explain, predict, generalize, and inform the research questions and hypotheses in a study. A theory in qualitative research can also be an explanation or a lens that informs the phases of the research process. In social, behavioral, and health science research, the theory may be one drawn from the social sciences, such as a theory of diffusion, leadership, or behavioral change. One finds these theories in the literature, and the researcher locates them by closely reading journal articles and research studies that include theories. They typically inform the quantitative side of research and help in determining what questions to ask. In qualitative research, they may be advanced at the beginning of a study (e.g., an ethnographic theory of acculturation), or

they may emerge through data collection (e.g., in grounded theory research). It is helpful in mixed methods studies to make these theories explicit, to describe them in some detail, to identify the author(s) of the theory, and to suggest how the theory informs a particular phase in the mixed methods study (e.g., the quantitative component of data collection). Often this is presented in a study as a diagram or figure.

RECOMMENDATIONS FROM THIS CHAPTER

I would recommend that researchers planning or conducting a mixed methods study be able to

- define mixed methods research in a study,
- recognize when their proposed study does not meet the definition of mixed methods research, and
- evaluate their idea for a mixed methods project by asking themselves the following questions about key characteristics:
    - Am I collecting and analyzing quantitative and qualitative data in response to research questions?
    - Am I using rigorous qualitative and quantitative methods?
    - Have I identified a mixed methods design for my procedures?
    - Am I integrating the quantitative and qualitative data within the design?
    - Am I drawing metainferences from my integration analysis?
    - Have I incorporated a theory or conceptual framework? Have I reflected on my philosophical assumptions that I bring to the research study?

ADDITIONAL READINGS

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Los Angeles, CA: SAGE.

Fetters, M. D. (2020). *The mixed methods research workbook: Activities for designing, implementing, and publishing projects.* Los Angeles, CA: SAGE.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112–133.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Thousand Oaks, CA: SAGE.

Skills, Experiences, and Attitudes to Conduct Mixed Methods Research

2

QUESTIONS ADDRESSED IN THIS CHAPTER:

- What skills are essential in conducting mixed methods research?
- How does a researcher learn these skills?
- What attitude should a researcher have toward methodology?

QUANTITATIVE AND QUALITATIVE RESEARCH SKILLS

When I introduced the characteristics of mixed methods research, I suggested that researchers include rigorous quantitative and qualitative methods. This requires obtaining and knowing the methods. In addition, researchers also need skills in mixed methods research. As I review quantitative, qualitative, and mixed methods research skills, there are many ways that I could have talked about these skills. For example, there are specific quantitative guidelines for an experimental intervention trial as found in the CONSORT 2010 statement in the *Annals of Internal Medicine* (Schulz et al., 2010) or the specific guidance for qualitative research from the Robert Wood Johnson Foundation (Cohen & Crabtree, 2006). For this discussion, I wanted to advance current resources that reflect important thinking in both quantitative and qualitative research. A source for both quantitative and qualitative research skills would be the American Psychological Association's (APA's) "standards" recently published in *American Psychologist* (Applebaum et al., 2018; Levitt et al., 2018) and then published in 2019 in the *Publication Manual* (American Psychological Association, 2019). These "standards" were constructed by both a quantitative and qualitative task force with the charge of developing "standards" that writers and reviewers of APA journal articles might use. My discussion, of course,

simplifies and condenses the "standards," and I refer the reader to the original discussions for further elaboration.

As shown in Tables 2.1 and 2.2, the task forces constructed the "standards" to follow the steps in the process of research. The process starts with defining a problem; forming hypotheses or questions (as well as purpose statements or aims); collecting, analyzing, and interpreting (or drawing inferences) from the data; and disseminating the results. To discuss research as a process of steps is something I have followed in writing all of my research methods books. It holds for both quantitative and qualitative research, but with differences between the two approaches residing not in the general process but in how each part of the process unfolds in an actual research study.

TABLE 2.1

Skills in Quantitative Research

Skill Categories	Specific Skills, Know How to:
Research problem	_____Identify why quantitative research is well suited for studying the research problem _____Select theoretical and practical implications for the problem _____Relate the problem to previous scholarship and how it adds to the literature
Hypotheses, aims, and objectives	_____Write hypotheses, research questions, aims, and objectives that incorporate variables _____Relate these statements to the research design
Data collection	_____Report demographics for a sample _____Recruit, gain permission, and include/exclude participants in the study _____Identify an appropriate sampling strategy _____Calculate an appropriate size, power, and precision for a sample _____Identify appropriate methods for collecting data _____Calculate estimates of reliability and validity for the measures _____Identify the type of design and whether conditions were manipulated or naturally observed _____Address ethical issues related to data collection

Skill Categories	Specific Skills, Know How to:
Data analysis	_____Calculate for missing data _____Use inferential statistics _____Use quantitative software for analysis _____Apply both descriptive and inferential statistics _____Report results of inferential tests, including *p*–values, effect sizes, and confidence intervals _____Apply complex data analysis (e.g., structural equation modeling) if used
Discussion	_____Discuss support or nonsupport for hypotheses, questions, etc. _____Interpret the results in view of research by others, biases, imprecision of measures, adequacy of sample size, etc. _____Discuss generalizability of the results
Dissemination	_____Use the formal quantitative structure for reporting research _____Publish in outlets for quantitative research

Source: Adapted from JARS-Quant, Applebaum, Cooper, Kline, et al. (2018).

TABLE 2.2

Skills in Qualitative Research

Skill Categories	Specific Skills, Know How to:
Research problem	_____Frame the research problem and relate it to applicable literature _____Design case examples, personal narratives, and vignettes for the introduction
Purpose, aims, and objectives	_____State the purpose, goals, or aims of the study that include the target audience _____Describe the approach to inquiry (e.g., interpretive, theoretical), if it helps to understand the purpose, goals, or aims
Method	_____Summarize the overall research design (e.g., interpretive, constructivist, feminist, grounded theory, ethnography) and why the design was chosen

(Continued)

TABLE 2.2 (CONTINUED)

Skill Categories	Specific Skills, Know How to:
Researcher, study participants, and data collection	_____State researcher reflexivity based on personal experiences and how it shapes the interpretation of data _____Identify the appropriate number of participants, their recruitment, and their selection _____State the forms of data collection (e.g., interviews, observations) _____Identify the questions asked during data collection _____Convey the extensiveness of data collection _____Identify audio/visual recording methods _____Identify ethical issues related to data collection
Data analysis	_____Know the process of data analysis, including coding and theme identification _____Provide illustrations and descriptions of analytic schemes _____Apply qualitative software for data analysis _____Identify the integrity (i.e., validity) of the claims made and the strategies used to document it _____Describe interrater reliability (i.e., intercoder agreement)
Research findings	_____Present findings compatible with the research design or approach to inquiry _____Develop synthesizing illustrations (e.g., diagrams, tables)
Discussion	_____Describe the central contribution of the study _____Identify how the study conclusions are similar or different from prior literature
Dissemination	_____Know the varied structures that relate to the different approaches to qualitative inquiry _____Familiarity with publication outlets for qualitative research

Source: Adapted from JARS-Qual, Levitt, Bamberg, Creswell, et al. (2018).

In Tables 2.1 and 2.2, I have adapted the "standards" to reflect specific skills needed by a researcher when conducting research. I added to the APA skill set a category about the dissemination of results because this is an important skill to know. It should be mentioned that qualitative researchers in general are reluctant to set forth standards or a checklist of features that should belong in a good qualitative methods section of a study. Such standards would constrain emerging and creative ideas. However, I think that all researchers recognize that qualitative inquirers do have certain procedures in mind when they engage in research. Likewise, quantitative researchers tend to operate with procedures even more fixed than in qualitative research.

As shown in Table 2.1, I concur that quantitative research is largely deductive in approach, working from a theory or conceptual framework that the researcher tests and supports or refutes. Standards such as validity, reliability, generalizability, and the control of bias provide a foundation of skills to be obtained by the quantitative researcher. Qualitative research, on the other hand, is much more inductive, developing from the perspectives of participants in a study and building to larger themes and perspectives that characterize the phenomenon under study. Qualitative skills require understanding reflectivity, saturation of the data, validity strategies, and interpretive approaches used by the researcher. In both approaches to research, the importance of questions and hypotheses and their link to specific designs form the foundation for building research skills.

MIXED METHODS SKILLS

In writing this discussion, I wanted to identify skills being currently discussed in the literature about mixed methods research. Consequently, I turned to the APA standards for mixed methods research (Levitt et al., 2018) and augmented this list with the self-rated mixed methods skill assessment recommendations developed by Guetterman et al. (2017). This self-rated assessment of mixed methods skills was developed as an intake assessment for the scholars participating in the National Institutes of Health and its Office of Behavioral and Social Sciences, Mixed Methods Research Training Program (MMRTP) housed at Johns Hopkins University (https://www.jhsph.edu/academics/training-programs/mixed-methods-training-program-for-the-health-sciences/).

The skills presented in Table 2.3 reinforce my defining characteristics of mixed methods research that I advanced in Chapter 1. They do not emphasize (as I would) the three central features of mixed methods found in integration, a specific mixed methods design, and the metainferences that need to be identified. I do feel that covering all of these skills will provide a good foundation for conducting a mixed methods study. In this skill set, one finds new features of mixed methods that will be discussed in more detail later in this book, such as a mixed methods question, the diagram of the design

procedures, the strategies for linking validity threats to a design, integrating the data in a mixed methods joint display analysis, and drawing metainferences from a joint display table.

TABLE 2.3

Skills in Mixed Methods Research

Skill Categories	Specific Skills, Know How to:
Research problem	_____Use mixed methods research when the problem needs to be addressed by both quantitative and qualitative research _____Ground the study in a theoretical or conceptual framework
Research objectives, aims, and goals	_____Write good qualitative, quantitative, and mixed methods questions _____Link the questions to the research problem _____Identify personal philosophical assumptions guiding the research _____Justify the use of mixed methods methodology
Design/approach	_____Identify the appropriate mixed methods design to study the problem/questions _____Draw a diagram of the procedures _____Justify the choice of an appropriate design _____Identify validity threats of the specific design used
Sampling and data collection	_____Identify a sampling strategy that matches the mixed methods design _____Calculate appropriate quantitative and qualitative sample sizes _____Organize the sources of data into quantitative and qualitative data types _____Convey the sources of data in the order that matches the design procedures _____Identify ethical issues related to the sampling, data collection, and the design

Skill Categories	Specific Skills, Know How to:
Data analysis	_____Separately report the quantitative and qualitative data analysis _____Integrate the two databases _____Construct a mixed methods data analysis table for integration (a joint display)
Inferences	_____Draw metainferences from a joint display table _____Relate the metainferences to past literature and theory
Dissemination	_____Construct an appropriate writing structure that matches the design _____Communicate results of a mixed methods study to lay audiences

Source: Adapted from Guetterman, T. C., Creswell, J. W., Wittink, et. al. (2017); Levitt, Bamberg, Creswell, et. al. (2018).

MIXED METHODS TEAMS

The above discussion focuses on the skills that an individual might have to conduct mixed methods research. Unfortunately, most individuals do not have the luxury of building a comprehensive skill set. An alternative would be to participate in a mixed methods team with individuals having different skills. One physician said to me at my workshop, "What is the minimum I need to know to conduct mixed methods research?" I answered that either you need to know about data collection and data analysis for both quantitative and qualitative research, or you need to join a team with individuals who have skills in this area. An academic team makes sense, and we have seen a growing presence of mixed methods teams in academia because of the increased frequency of interdisciplinary research. Individuals on these teams hold different methodological orientations—quantitative and qualitative skills. Team members with mixed methods skills may serve as the bridge between these two groups and facilitate the conversation about differences in thinking when they arise. We might have a medical sociologist sitting next to a biostatistician or an anthropologist working on a team with a measurement specialist. In global research settings, the diversity of participants on a team may be even more pronounced, with individuals bringing their own local cultural norms to the research table.

How do these diverse team members interact? When academic teams work on a problem, individuals may relate to the discussion from their own disciplinary perspective (working parallel to their own discipline) or from an

interdisciplinary perspective (working across disciplinary fields) (see O'Cathain, Murphy, & Nicholl, 2008a). Overlaying these methodological differences may be the extent to which individuals cross disciplinary boundaries or stay within their own field's perspective as they work on a team. O'Cathain et al. (2008a, p. 1579) advanced possible configurations, as shown in Table 2.4.

TABLE 2.4

Different Disciplinary Configurations of Members on a Mixed Methods Team

Team A: Principal investigator (medical) led the quantitative component; sociologist led the qualitative component and was responsible for parts of the quantitative component; statistician; and project researchers
Team B: Principal investigator (social scientist) led the qualitative and quantitative components; clinicians; psychologist; statistician; and two project researchers
Team C: Principal investigator (clinical) led the qualitative and quantitative components with two project researchers

Source: O'Cathain, Murphy, & Nicholl (2008, p. 1579). Permission granted by SAGE Publications.

In current writings, we see that successful mixed methods teams have research support, have members with a range of expertise, engage in either multidisciplinary or interdisciplinary interactions, hold respect for diverse methodological orientations, and have a good leader who bridges across the areas of expertise and methodological persuasions. This leader pays attention to team composition, gives equal treatment to diverse methodologies, helps to shape dialogue, and values and involves all team members in decisions (Brannen & Moss, 2012). This leader also constructs a shared vision and develops a history of working together. Moreover, the team leader for a mixed methods project ideally has experience in quantitative, qualitative, and mixed methods research.

EXPERIENCES IN MIXED METHODS RESEARCH

When asked about the skill set needed to undertake a mixed methods study, I often refer to experiences gained by students in my graduate program at the University of Nebraska–Lincoln. Graduate students entered a mixed methods course after they had completed classes on statistics and quantitative designs (e.g., experimental designs) and one or two qualitative research classes. This approach reinforced the need for quantitative and qualitative skills as a prerequisite to learning mixed methods research.

As shown in Table 2.5, at the top of my list of experiences would be taking courses or training in mixed methods research (as well as quantitative and qualitative research). Both courses and training have moved online with the current virus pandemic, and this has probably enhanced their availability to scholars. I know that in the Michigan Mixed Methods Research Program (mixedmethods.org), online workshops are now being offered on the general designs of mixed methods research at least three times a year. Conferences provide keynotes,

TABLE 2.5

Experiences Building Mixed Methods Skills

Type of Experience	Examples of Experiences	Description of the Experience
Training experiences	_____Taking or teaching courses in research methods and mixed methods research _____Attending conferences where mixed methods papers are presented _____Attending mixed methods workshops	_____Taking or teaching qualitative, quantitative, and mixed methods courses _____Attending a mixed methods conference and mixed methods sessions at other conferences _____Attending a mixed methods workshop training program
Research experiences	_____Reading books and articles _____Working on projects _____Getting funded projects	_____Routinely reading what has been written about mixed methods and remaining current _____Working on projects to hone skills to conduct mixed methods research _____Obtaining a funded mixed methods study
Mentoring experiences	_____Mentoring others _____Being mentored	_____Assisting others in mixed methods projects in peer review or consultation _____Finding and working with an experienced mixed methods mentor

Source: Adapted from Gutterman (2017).

sessions, and workshops that are going online. The scholar Mixed Methods Research Training Program sponsored by the National Institutes of Health and the Office of Behavioral and Social Sciences represents a national training program for mixed methods in the health sciences coordinated at Johns Hopkins University (https://www.jhsph.edu/academics/training-programs/mixed-methods-training-program-for-the-health-sciences/about-the-program/).

In terms of research experiences, researchers can obtain skills by participating in a research project, writing an application for funding to a federal agency or a private foundation, and reading books on mixed methods research. My estimate would be that over 40 books have been written on this methodology, and they reflect different orientations from more philosophically oriented to theoretically positioned and methodologically focused. By reading these books, one can learn the language of mixed methods research, and many contain a glossary of important terms. Further, reading mixed methods articles published either as a methodology piece (focused on how to conduct the research) or as an empirical study (focused on the application of mixed methods to a topic) will further contribute to skills.

Finally, skills can be learned from mentors. In the Johns Hopkins Mixed Methods Research Training Program, emerging scholars are matched with experienced mixed methods consultants for one year. During this year, mentees' projects are discussed with the mentors. Those skilled in mixed methods research can also become mentors themselves and offer campus workshops or lectures about this methodology.

ATTITUDES TOWARD RESEARCH METHODOLOGIES

When I wrote about conducting qualitative research (Creswell & Poth, 2018), I included a chapter about the type of thinking that would be helpful for a qualitative researcher to have. What about a mixed methods researcher? I find no definitive list of personal perspectives useful for a mixed methods researcher, but from my years of experience in the field, I feel that certain perspective or attitudes are certainly important as one ventures into mixed methods.

An openness to the diversity of research methodology certainly helps. This often means setting aside the narrow training in methods gained through graduate school or through experiences and being open to looking at research problems through the lens of different approaches. Reading about mixed methods, engaging in training in this approach, and experiencing the steps of a mixed methods project certainly help to create this openness. Having a mentor who has opened the mixed methods door also helps. Further, I see mixed methods research as a creative process where the investigator often invents ways to proceed and present information. For example, there are no fixed procedures for mixed methods designs and even fewer templates for diagramming the design of a study. This calls for the researcher to be inventive. The tables of joint displays

also need to be creatively shaped by the researcher without fixed approaches in the literature. In short, an openness to creativity is a certain part of conducting this form of research. Helpful also is a willingness to share with others, such as sharing research studies, reviewing projects of others, and educating advisers, committee members, journal editors, and funding application review team members about mixed methods research. An attitude of helping others understand this methodology goes a long way in promoting the field and in having a satisfactory experience with this approach.

RECOMMENDATIONS FROM THIS CHAPTER

The position I have taken is to urge mixed methods researchers to become skilled in quantitative, qualitative, and mixed methods research. A current list of skills can be drawn from recent publications of practices and standards. Collaboration on teams represents good team interactions, and it requires individuals to openly share their different methodological orientations under the guidance of a leader with diverse research skills. Whether the mixed methods project is undertaken by an individual or a team, the skills developed may come from coursework or training, research experiences, and being mentored or mentoring others. Augmenting the skills and the training would be the personal experiences or attitudes necessary to conduct this research. An openness to diverse methodologies is essential, as well as the creative process involved in many aspects of the methodology and the willingness to share work with others and obtaining their feedback.

ADDITIONAL READINGS

Creswell, J. W., & Báez, J. C. (2020). *30 essential skills for the qualitative researcher* (2nd ed.). Los Angeles, CA: SAGE.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: SAGE.

O'Cathain, A., Murphy, E., & Nicholl, J. (2008a). Multidisciplinary, interdisciplinary, or dysfunctional? Team working in mixed-methods research. *Qualitative Health Research, 18*, 1574–1585.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

VERBI GmbH. (2013). MAXQDA [Computer software]. Retrieved from www.maxqda.com/

Steps in Planning a Mixed Methods Study

3

QUESTIONS ADDRESSED IN THIS CHAPTER:

- Should a researcher plan a mixed methods study in advance before the study begins?
- What are the steps that I would recommend to a researcher planning a mixed methods study?

THE IMPORTANCE OF PLANNING A STUDY

Building on the skills, experiences, and attitudes necessary to conduct mixed methods research, the next step is to actually plan a study. I believe in working out the details of a project in advance, but I also recognize that some mixed methods projects emerge while the study is ongoing. In some studies, the opportunities to collect both quantitative and qualitative data or to collect new data may develop during the projects, and the researchers need to shift more toward mixed methods or alter their current design. Also, researchers may become involved in training opportunities or experiences in mixed methods and decide that a mixed methods approach provides the best way to understand their research problem or questions and that it adds to the rigor and sophistication of their projects. Further, to file an application for the institutional review board necessitates planning a study in advance. Likewise, for graduate students who are required to undertake a research project, a preplanned proposal of their project must be completed and approved prior to conducting their study.

I always encourage researchers to plan their projects in advance as much as possible. Therefore, in this chapter, I thought that I would set the stage for planning by discussing steps researchers might use in planning their projects. The easiest way to do this planning is for the reader to visualize coming into

my office for advice about a project and I would proceed by going step-by-step through the mixed methods planning process. To complete all of the steps would require several office sessions. The end goal would be to generate a general template for designing a study. After each step, I would review the written work on the step and provide feedback. Hopefully, by introducing these steps, the project will incorporate some of the latest thinking in the field of mixed methods research.

During the initial conversation, there would be a few preliminaries to get out of the way. First, I would inquire about the overall support that exists for your project. Is there an audience for the project supportive of using mixed methods research (e.g., graduate committee, journal reviewers, book publishers, funding agencies)? Then, is there access and permission to collect both quantitative and qualitative data? In terms of skills, are skills in place for quantitative research, qualitative research, and mixed methods research? Answers to these questions would help me think about the background the researcher brings to the study.

STEPS IN THE PROCESS OF MIXED METHODS RESEARCH

Then I would ask the researcher to begin writing a plan that includes several steps in the process of designing a mixed methods project. These steps are not fixed and set as rigid procedures, but they provide a good place to begin, and they will be further elaborated in the future as the field of mixed methods continues to grow. In this chapter, I will introduce each step and then elaborate on them further in additional chapters in this book. To provide an overview of the process, here is a brief summary of the steps:

1. Draft a working title for the project
2. Write about the research problem and shape it toward mixed methods
3. State the general question, aim, or objective of the study
4. Consider whether to include a worldview and a theory
5. Detail the methods section
    A. Define mixed methods research
    B. Identify a rationale for using mixed methods research in the project
    C. Specify the types of qualitative and quantitative data collection and analysis
    D. Choose a mixed methods design and draw a diagram of procedures

E. Identify the process of integrating the data in the design
F. Identify the validity and ethical issues within the design

6. Consider how metainferences will be drawn from integration
7. Revisit your questions, aims, or objectives

1. Draft a Working Title

Begin by writing a draft title for the study. Starting with the title may seem like a strange place to begin. Often people write the title as one of the last steps in their process. However, I view the title as a major placeholder in a study—a focal point for the entire project. Taking a stand on a title is therefore an essential part of designing a study. Granted, the title will change and shift over time as the project becomes more and more clearly defined and focused.

There are several key elements that I recommend to include in a good mixed methods title:

- The topic addressed (e.g., palliative care or bullying in the schools)
- The participants in the study (i.e., the individuals from whom the data are being collected, such as elderly patients or senior citizens)
- The site where the participants reside (e.g., a major university or a senior center)
- The words *mixed methods* to denote the methodology being used

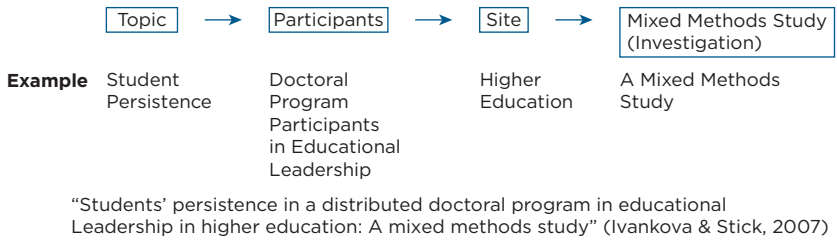
As shown in Figure 3.1, I use a **template** for writing a good mixed method title. This figure shows the sequence for staging the ideas from the topic, presented in a couple of words, to the participants, the site, and ending with notifying the reader that the project will be mixed methods. I give an example from a published study to see how these components might be presented. Typically, we need to identify the participants in a study, but it may not be necessary to also add the site for the project. The site may be combined in the description of the participants (e.g., high school students or hospital nurses). The incorporation of the words *mixed methods study* or *mixed methods investigation* is, I believe, necessary today to signal this relatively new methodology for key readers and reviewers of the project. Further, notice that I have not used words that denote the project as either quantitative or qualitative research. This is intentional, as I see mixed methods as a methodology in its own right that resides between quantitative and qualitative research. I recommend neutral language (as seen in the example in Figure 3.1) that does not use language related to quantitative research (e.g., variables, determinates, correlates) or related to qualitative research (e.g., explore, the meaning, generate, understand, discover). Later, once we have a mixed methods design in place for the study, we may slightly reshape the title

to reflect the procedures of the design. However, for now we will keep the title neutral and short (say under 10 words) and present a two-part title as shown in the example with the parts separated by a colon. Here is an example of another good title from a published study:

> Example 1. Unwritten rules of talking to doctors about depression: Integrating quantitative and qualitative methods (Wittink, Barg, & Gallo, 2006)

FIGURE 3.1

A Template for Writing a Good Mixed Methods Title



Source: Example adapted from Ivankova & Stick, 2007.

2. Write About the Research Problem and Shape It Toward Mixed Methods

Next, write a short paragraph detailing the research problem being addressed in the study. A **research problem** states the issue or concern being studied in a mixed methods project. This statement should mention an actual problem, not what currently exists in a situation. It is easy to write about what currently exists; it is more difficult to identify a problem or issue that arises from the current situation. Further, document the importance of this problem by citing literature, current practices, or some combination of these factors. This problem statement, typically found in an introduction to a study, is certainly one of the most important components in research. If a reader is reading a study and does not find a compelling problem being addressed at the outset, he or she will quickly lose interest in the study. To design this statement, think like a novelist. Open the discussion about an issue that demands immediate attention.

The important point in writing about the problem is to advance an argument that the problem can be best addressed using mixed methods research. Often this reason lies in the value that can be achieved through collecting and analyzing both quantitative and qualitative research. In addition, when we combine the two

databases, we can have a more complete understanding of the problem or added insight into the problem. Further, the use of research literature to document the problem can be drawn from both quantitative and qualitative studies (as well as mixed methods studies). Consequently, we need to find in a discussion of the research problem many reasons for the importance of the problem, and one of these would be the value of mixed methods in understanding it.

3. State the General Question, Aim, or Objective

Next compose and write a general question, aim, or objective of the study. This can be phrased in a single sentence or question. In designing this sentence or question, consider the outcome at the end of the project. What outcome should the reader be learning about by the end of the project?

The writing of this statement or question provides clues as to a researcher's preferences for quantitative or qualitative approaches. If this statement or question indicates an interest in "understanding" something or "exploring" something, then the beginning point for the project will likely be qualitative research. Alternatively, if the statement or question focuses on "relating variables" or "predicting the relationship among variables or among groups," the initial first phase will often be quantitative research. This question or statement helps me think about the most appropriate design that will be used in the study.

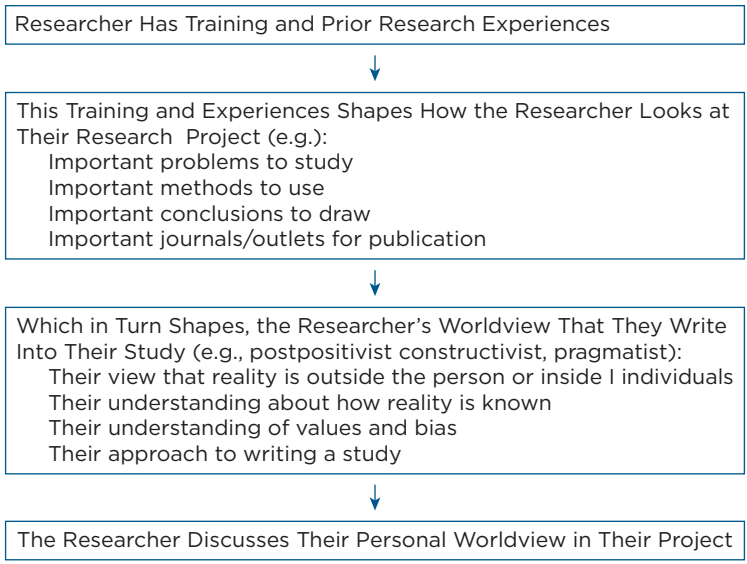
4. Consider a Worldview and a Theory

This next step in the process involves thinking about whether to include a worldview and a theory in the study. I recommend both, but I recognize that worldviews are not always presented in studies and may be used more in social science projects rather than health science studies. Theories (or conceptual frameworks), on the other hand, are incorporated in many mixed methods projects regardless of field or discipline affiliation. Paragraphs need to be written into the research plan that detail both the worldview used and the theory applied in a mixed methods project. To incorporate either of these two ideas requires an understanding of both and how they relate to a project. These topics were introduced in Chapter 1, but I will go into them in more detail here.

Both worldviews and theories operate at an abstract level and provide a framework for designing the study. Worldviews (or paradigms or frameworks, or philosophical assumptions) consist of the values and beliefs brought to a project by the researcher. Figure 3.2 illustrates how this works. As shown in this figure, many years ago, Kuhn (1962) wrote about the origins of researchers' beliefs. Essentially, he felt that they came from past training where researchers were socialized within fields and disciplines of study to understand the best approach to do research. We are socialized, says Kuhn, as researchers, to hold certain beliefs. Within a field or discipline, there are typical problems pursued, distinct ways to study these problems, outcomes for our studies, and approaches to disseminating our scholarly work. They come from professional

FIGURE 3.2

Worldview (or Philosophy) Brought by a Mixed Methods Researcher to the Study



community affiliations and past training. This is, for example, why psychologists have types of problems they study, methods that they favor, data analysis procedures they emphasize, and generally have some consensus about how to approach their research.

Thus, this socialization informs how the researchers look at their research (e.g., the problems worthy of study, the preferred methods). In turn, it shapes the philosophical worldview taken by them, such as their view of reality (ontology), how reality is known (epistemology), the importance of personal values and biases (axiology), the methods used in the study (methodology), and the voice used in the written report (rhetoric). Finally, the worldview is then written by researchers into their projects. The researcher discusses the beliefs and assumptions they bring to a study in a separate section positioned in the introduction or the methods section.

These worldviews can take on different meanings. Some worldviews are postpostivism, constructivism, participatory, and pragmatism, as noted in Chapter 1. Many mixed methods researchers ascribe to a pragmatist position in their research (see Tashakkori & Teddlie, 2010). I have summarized these philosophical beliefs and camps elsewhere (see Creswell & Creswell, 2018), and they are found in books and articles on qualitative research, such as Lincoln, Lynham, and Guba (2011).

Like worldviews, theories (or conceptual frameworks or theoretical rationales) operate at the abstract level, but they differ in that they come not from the researcher (typically), but from the literature and other researchers. Theories essentially provide a prediction as to what the researcher hopes to learn in a study. Theories, in contrast to worldviews, are commonly used in mixed methods studies. Researchers need to plan for determining what theory to use and how it will specifically be incorporated into the mixed methods project and then write about it in a plan. Examples of these theories would be feminist theories, social economic theories, disability theories, racial or ethnic theories, leadership theories, behavioral theories, or adaptation theories. By looking in the literature, researchers can find discussions of these theories, names for them, and authors who have applied them. A complete discussion of the theory informing the mixed methods study is needed in the plan for a project. They are often incorporated into the introduction of a study, and I recommend that they are named and made explicit in the diagram of a mixed methods design. For example, a leadership theory may inform the initial quantitative phase of a project and lead to the use of a leadership instrument that will be used in the project.

5. Detail the Methods Section

The methods section has several subtopics that I would recommend that researchers address about the methods in the order in which I present the topics.

Define mixed methods research. It is typical in research studies that investigators begin their methods section by describing their overall methodology (e.g., randomized controlled trial, quasi-experiment, ethnography). Readers may not be familiar with mixed methods, and defining it would pave the way for understanding the detailed methods. Many useful definitions exist in the literature, and I would recommend reading the article by Johnson, Onwuegbuzie, and Turner (2007). One place to begin is with the core characteristics mentioned in Chapter 1.

- Collect and analyze quantitative and qualitative data in response to research questions.
- Use rigorous qualitative and quantitative methods.
- Incorporate procedures in a mixed methods design.
- Integrate qualitative and quantitative data in the design.
- Draw metainferences from this integration.
- Include a worldview and a theory.

Identify a rationale for using mixed methods research. The next step in the process is to write a paragraph identifying the rationale for using mixed methods as a methodology. I believe that we need to advance a rationale for mixed methods today, much like the rationale for qualitative research typically needed in the 1980s when qualitative methods were new to researchers. Perhaps, as the methodology becomes more widely known and accepted, a rationale for its use will not be needed in the future. In the meantime, we need to convince readers that mixed methods is the appropriate methodology to use in our mixed methods studies. How is this done?

I see a two-part rationale in answer to this question. First, there is a general rationale for using mixed methods in a study. It is appropriate to use mixed methods when the use of quantitative research or qualitative research alone is insufficient for gaining an understanding of the problem. Using only one method may be limiting because of the inherent weaknesses of each approach. Quantitative research does not adequately investigate personal stories and meanings or deeply probe the perspectives of individuals. Qualitative research does not enable us to generalize from a small group of people to a large population. It does not precisely measure what people in general feel. In short, all research methods have both strengths and weaknesses, and the combination of the strengths of both provides a good rationale for using mixed methods (quantitative research provides an opportunity for generalization and precision; qualitative research offers an in-depth experience of individual perspectives). Alternatively, we might consider how the strengths of one form of research make up for the weaknesses of the other. This was the core argument advanced for the use of mixed methods in early writings about this methodology (see Rossman & Wilson, 1985).

Second, at a more specific level, write about why the combination (later to be discussed as "integration") of quantitative and qualitative research is a justification for using mixed methods. Several of these combinations are to

- obtain two different perspectives, one drawn from closed-ended response data (quantitative) and one drawn from open-ended personal data (qualitative);
- obtain a more comprehensive view and more data about the problem than either the quantitative or the qualitative perspective;
- add to instrument data (quantitative information) details about the setting, place, and context of personal experiences (qualitative information);
- conduct preliminary exploration with individuals (qualitative research) to make sure that instruments, measures, and intervention (quantitative research) actually fit the participants and cultural site being studied; and

- add qualitative data to our experimental trials (quantitative research), for example, by identifying participants to recruit and interventions to use, assessing the personal experiences of participants during the trial, and carrying out follow-up to further explain the outcomes.

In writing the plan for a study, I recommend identifying both the general rationale for using mixed methods and the specific reason that speaks to combining or integrating the data. As I will make more explicit in the discussion of designs in Chapter 5 and 6, the rationale needs to be linked to a specific type of mixed methods design.

Specify the types of quantitative and qualitative data collection and analysis. In order to build toward a mixed methods design, I recommend next presenting the types of quantitative and qualitative data that will be collected and analyzed. Draw two columns, and then list under each the forms of data collection and analysis that will be used in the project. I typically coach researchers to identify the following items (for both quantitative and qualitative data) under data collection:

- Participants
- Site for the research
- Number of participants and how they are recruited
- Types of information to be collected (e.g., measures and variables quantitatively, central phenomena qualitatively)
- Types of data (e.g., instrument, records, interviews)

I also have them list the specific forms of data analysis they anticipate using:

- Procedures for organizing the data (e.g., putting it into an SPSS file, having the audio recording transcribed)
- Basic data analysis procedures (e.g., coding qualitative data, descriptive analysis of quantitative data)
- More advanced data analysis procedures (e.g., comparing groups or relating variables quantitatively, developing themes or a chronology qualitatively)
- Software programs that might be used (e.g., SPSS, MAXQDA)

Choose a mixed methods design and draw a diagram of procedures. A research plan is a good place to write about the mixed methods design in the study and why it is an appropriate design to address the research problem.

A choice of a mixed methods design requires knowing the types of designs available and then deciding which one best addresses the questions, aims, or goals of the study. I review in Chapters 5 and 6 the types of designs presented in Creswell and Plano Clark (2018). I will discuss in those chapters more detail about the three "core" designs (convergent, explanatory sequential, and exploratory sequential) that are included in all mixed methods studies and then the possibility of embedding these core designs into larger frameworks or processes leading to "complex" designs (such as in evaluations, in experiments, in case studies, in participatory action studies, and so forth). Write about the "core" design to be used in the project and think about whether this core design is embedded in a larger process or framework so that you have a "complex" design.

Following this step, I recommend drafting a diagram of the procedures in the proposed study (see Chapter 7). This diagram could mention the flow of quantitative and qualitative data collection and analysis, the specific details of each step, and the outcomes. Recognize that these diagrams go through many iterations as the project becomes clearer to the researcher. Specific features could be added into this diagram, such as aims or questions for each phase, a timeline, an appropriate title, notation, or other features. Many examples of diagrams for mixed methods designs appear in Chapter 7.

Identify the process of integrating the data in the design. Looking at the diagram, we can discuss where the integration of the quantitative and quantitative data occurs. Integration occurs where the quantitative and qualitative data connect, either through the data collection, the data analysis, or both. At this point, I recommend putting an arrow into the diagram that indicates the precise place (or places) where integration occurs. Also, a written discussion about this integration can go into a plan stating the intent and the process of the integration (see Chapter 8). Further, a hypothetical table could be drafted that shows how the quantitative and qualitative data will be aligned for comparison (a joint display table).

Identify the validity and ethical issues. Looking closely again at the diagram can also be useful in writing about the challenges that might arise that threaten the validity of the study and the inferences drawn from it. I recommend that the written plan include discussions about the validity related to the quantitative data, the qualitative data, and the validity issues for mixed methods that arise from the specific design used. It is important not only to point out what the challenges to validity might be but also to suggest how the challenges are being addressed in the project. For example, if the design is a convergent design, challenges to drawing good inferences result from a mismatch between the quantitative questions and the qualitative questions, and a rationale for sample sizes is needed. Further, the results from a convergent design raise the challenge of explaining differences between the quantitative and qualitative results if they occur.

The design, too, is one place to examine and write about ethical issues in data collection or data analysis. I would remind the researcher that ethical issues can occur in mixed methods in many phases of a research project, such as prior to conducting the study, designing the study, aspects in the mixed methods design, and reporting, sharing, and storing the data (see Creswell & Creswell, 2018). All of the ethical issues may not be apparent at this stage in the research, but a table could be constructed that identifies the potential ethical issues and strategies to be used to address them.

6. Plan for Metainferences From the Integration

Similar to specifying validity and ethical issues, it is difficult to plan in advance what metainferences will be drawn from an integration of the data. Still, it is important to write about what occurs when the two databases are compared and the possible conclusions that need to be drawn (Fetters, 2020). This facet represents the insight that can emerge in a mixed methods study beyond what was learned from analyzing both the quantitative and qualitative data. Many outcomes will result from a study, and certainly a most important one would be the inferences drawn from looking across the two databases. Writing about this signals to a reader an understanding of integration and its importance in a mixed methods study.

7. Revisit the Questions, Aims, and Objectives

The questions, aims, or objectives posed in Step 3 need to be revisited and reshaped because now we have a mixed methods design in mind. Specify quantitative questions or hypotheses and qualitative questions. Add mixed method questions that address the potential outcomes from the integration (see Chapter 4). The Step 3 questions, aims, and objectives can now be replaced with more specific statements or questions.

RECOMMENDATIONS FROM THIS CHAPTER

In this chapter, I have reviewed the steps that I typically use to advise individuals planning a mixed methods study. I do believe in preplanning a study rather than allowing it entirely to evolve. I also believe that the steps originally planned can be revised during the completion of a project and that the steps conveyed here are not a definitive, unchanging guide. I began with preliminary steps—the draft title, the research problem, and the general question, aim, or objective. I suggested the inclusion of a worldview discussion and the identification of a theory in the study. In writing the research methods into the plan, I emphasized the need to define mixed methods research, presented a rationale for using it, specified the types of quantitative and qualitative data to be collected and analyzed, and offered the choice of a

mixed methods design. I further talked about drawing a diagram of the procedures in the design and using this diagram to think about integration, the validity challenges, and the ethical issues. Finally, I emphasized the importance of writing about potential metainferences from the integration and revisiting the question, aim, or objective to tailor it to the mixed methods design.

ADDITIONAL READINGS

For planning a mixed methods study, see the following:

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative and mixed methods approaches* (5th ed.). Los Angeles, CA: SAGE.

For the worldview discussion, consult the following:

Kuhn, T. S. (1962). *The structure of scientific revolutions*. Chicago, IL: University of Chicago Press.

Lincoln, Y. S., Lynham, S., A., & Guba, E. G. (2011). Paradigms, controversies, contradictions, and emerging confluences revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (4th ed., pp. 97–128). Thousand Oaks, CA: SAGE.

For a discussion about definitions for mixed methods research, see the following:

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1,* 112–133. DOI: 10.1177/1558689806298224

For a discussion about types of mixed methods designs, see the following:

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: SAGE.

For a good example of a diagram, see the following:

Ivankova, N. V., & Stick, S. L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study. *Research in Higher Education, 48,* 93–135. DOI: 10.1007/s11162-006-9025-4

For a discussion about integration, see the following:

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—Principles and practices. *Health Services Research, 48,* 2134–2156. DOI: 10.1111/1475-6773.12117

For a discussion about metainferences, see the following:

Fetters, M. D. (2020). *The mixed methods research workbook: Activities for designing, implementing, and publishing projects.* Los Angeles, CA: SAGE.

Introducing a Mixed Methods Study

4

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How might a researcher introduce a mixed methods study?
- What are the components in writing good study aims or a purpose statement?
- What are the elements in writing good qualitative research questions, quantitative questions or hypotheses, and mixed methods questions?

CONSIDERING THE IMPORTANCE OF A GOOD INTRODUCTION

One of the most important aspects of any research study is the introduction. If authors do not catch the reader in the first few paragraphs of a study, they are likely to lose their audience before the project even begins. This opening section must create a problem or issue that needs to be addressed, convince the reader of the importance of this issue, and signal how important it is to come up with potential solutions to this problem. Novelists know this approach well. They invite the reader into a dilemma at the outset and then provide enough clues as the pages proceed to give readers the feeling that they are inching ever closer to solving or at least learning about the problem. Similarly, composers create chords with dissonance and then resolve that dissonance with pleasing chords. Sitcom producers often string along two or three major dilemmas, hoping at the end of the half-hour program to bring them all to a satisfactory conclusion, either in tandem or individually. Thus, this model of research—creating a problem or issue that will subsequently be addressed—is not new and is familiar to us in many realms of our lives.

INCLUDING COMPONENTS OF A MIXED METHODS INTRODUCTION

For several years, the importance of following a script outlining the components of an introduction has been emphasized in my research methods books (see Creswell & Creswell, 2018). This script has been called a "social science deficiency" model for writing an introduction to a study, but it applies equally to the health sciences and to mixed methods. An introduction to a study is intended to spark readers' interest in the subject, specify a problem or issue that needs to be addressed, convey the specific aim (or purpose) of the study, and, in many cases, narrow the specific aim (or purpose) down to detailed research questions. The template for an introduction that I often see in rigorous studies in the social, behavioral, and health sciences has five sections.

1. The topic
2. The problem
3. The existing literature
4. Deficiencies in the literature
5. Audiences that will profit

Following these five sections are the purpose statement (or study aim) and the research questions. The five sections are described below.

The Topic

The first couple of sentences set the general topic for the study, such as depression screening or adolescent behavior in middle schools. Give references, cite statistics, and let the reader know that this is an important topic for consideration. Also give some attention to the first sentence, which colleagues in literature call a "narrative hook." In the first one or two sentences, it is important to get the attention of the readers and compel them to read on. Finally, give readers a topic that they can relate to, not something esoteric that will cause them to ponder and linger over the opening sentences. This might be referred to as "lowering the bucket (the reader) down into the well slowly."

The Problem

After introducing the topic, it is important to create a clear picture of the problem or issue that needs to be addressed by the research. Already in Chapter 3, I have mentioned this important component of the research process. Writing about the research problem is a difficult passage to write, and many researchers refer to "what is being done" rather than creating an issue or concern. Research

is intended to address problems. This may be stating the obvious, but I am not always sure that researchers understand this important fact. Also, it is sometimes difficult to describe the problem because it may be easier to write about what is being done rather than what *needs* to be done. In fact, here is how to think about the research problem: First mention what exists, and then point out the problem with what exists. What needs to be fixed?

Also, consider the origin of the problem. It can arise out of practice, out of a missing part of the literature, and out of personal experiences. These are good rationales for a problem, but I also like to see what I would call "practical" problems—problems that reside in practice or in the real world that need to be addressed. What do policymakers, health providers, or teachers need? Describe some combination of real-world problems and deficiencies in the literature.

Then the question arises as to how many problems to indicate in a mixed methods study. I have often found that mentioning only the "lack of research" is a modest, even weak referral to a problem. Claims could be made that the present literature does lack mixed methods studies that would provide a more complete understanding of the problem. However, in general, consider stating more than that "there is a need in the literature" or a "gap" or that the literature has shown "mixed results." The best problem statements draw on several sources for their origin: from literature, from practice, and so forth. Further, there may be multiple problems leading to a need for a study. Mention all of them. Also, provide citations to support claims about the problem. This becomes good scholarly research.

The Existing Literature

Next, convey the existing literature that has attempted to address the problem. This section is not a literature review but a general survey of the groups of studies that have addressed the problem. For some problems, literature may be nonexistent. For other problems, many studies may exist, but they may not speak squarely to the direction being taken in a particular study. Be sure to give citations in this section. Reference enough of the literature so that the reader can conclude that the review thoroughly addressed the literature and cited works that are as close as possible to the present mixed methods study.

Deficiencies in the Literature

In the next section, talk about what is missing in the literature that would help address the problem. Perhaps the missing part relates to the participants (studies are needed on Hispanics), or perhaps the relationship between variables is not well explained (results have been inconclusive about factors that dispose people to engage in cancer screening). It is in this section that mixed methods has an *important role*. The basic idea behind mixed methods is that something is gained when you (a) collect both quantitative and qualitative data and (b) integrate or use the databases in tandem. So, a deficiency in the literature may be directly related to a need for a mixed methods study. We may not have instruments that

are culturally sensitive, and we may need to first explore before we begin measuring and gathering information (i.e., an exploratory sequential design). We may not have good measures for a construct or for variables, and we may need to add interviews to ask participants about the construct so that we can get a "second opinion" on it (i.e., through a convergent design to be discussed in Chapter 5). We may need to conduct research to learn how best to recruit participants into an intervention trial and begin our trial with qualitative focus groups (i.e., an experimental design as discussed in Chapter 6).

The Audience

Identify the audience by determining which individuals or groups will profit from the research study. Hopefully, every reader will be part of this audience, if you cast the net widely enough. For example, the audience might be groups of people. How would policymakers, leaders, other researchers, practitioners in organizations or schools, or web audiences profit from the research? In this section, it is helpful to identify several audiences and be specific about how they might be helped by research that addresses the problem.

WRITING MIXED METHODS STUDY AIMS OR A PURPOSE STATEMENT

Study aims and purpose statements are the most important points made in a research project. They set forth the aims, central objective, or purpose for the entire study. Without clarity in this statement, the reader will be lost throughout the project. With mixed methods studies having many components, writing this statement presents a challenge for the researcher to decide what aspects need to be reported. Consider what important results will develop by the end of the study. Then, place this statement early in the study, typically in the introduction.

At the outset, I need to clarify that we typically write study aims for health science mixed methods projects and a purpose statement for social science projects. Both are intended to set forth the major direction for a study, but they differ in terms of structure and their presentation in a project. Following the study aims or the purpose statement, we have specific research questions or hypotheses. Further, these statements need to relate to the specific type of mixed methods design (to be addressed in Chapters 5 and 6). I begin with the aims and purpose statements and then turn to research questions and hypotheses.

Study Aims in the Health Sciences

When writing the study aims and questions for a health science study, begin by thinking about three aims and then fold the hypotheses or questions under each aim. The idea of having three aims for mixed methods research comes from the task force recommendations from the National Institutes of Health

(NIH), Office of Behavioral and Social Sciences (2018) report, *Best Practices for Mixed Methods in the Health Sciences* (also see Creswell, Klassen, Plano Clark, & Smith, 2011; https://www.obssr.od.nih.gov/wp-content/uploads/2018/01/Best-Practices-for-Mixed-Methods-Research-in-the-Health-Sciences-2018-01-25.pdf) (see Chapter 10 for more discussion). These recommendations sought to assist researchers developing applications for NIH funds as well as for individuals reviewing applications. One section of this report recommended study aims for an NIH project. It was felt that the study aims in a mixed methods project should include at least three aims—quantitative, qualitative, and mixed methods aims—and that they should reflect the type of mixed methods design being used. Two models exist for these aim statements. They can be incorporated into one statement, or, alternatively, they can be divided into three statements. The first approach is typically seen in health science journal articles. Here is an example of a single statement in a mixed methods journal article in a study of health-related quality of life in patients with serious nonspecific symptoms undergoing evaluation for possible cancer (Moseholm, Rydahl-Hansen, Lindhardt, & Fetters, 2016):

> Example 1. An example of a single aim statement
>
> The purpose of this research was to measure changes in HRQoL during the diagnostic evaluation of patients presenting with non-specific symptoms possibly attributable to cancer, to describe their experiences of HRQoL and to merge these findings with intent to obtain a more comprehensive understanding of their HRQoL experience during this stressful life event.

Note in this example the three components of mixed methods research: the quantitative component (to measure changes), the qualitative component (a description of experiences), and the mixed methods component (to merge the quantitative and qualitative findings).

In a second example, we can see three aims written for a hypothetical study examining the lives of senior citizens living in an assisted living facility during this current pandemic:

> Example 2. Three aims in a mixed methods study
>
> Aim 1: To qualitatively explore the experiences of senior citizens living in assisted living in contacting their nearest relatives. (Qualitative)
>
> Aim 2: To design a quantitative survey instrument to assess connections with relatives among a large population of senior citizens living in assisted living facilities. (Mixed methods)
>
> Aim 3: To administer the survey and explore the determinants of quality of relative contact among senior citizens living in assisted living facilities during this pandemic.

The first aim illustrates a qualitative aim focused on exploring, while the second aim addresses building a survey instrument using data from the initial exploration (the qualitative data are connected to the design of a quantitative survey—mixed methods). The third aim then tested out the survey that was designed to be culturally specific to senior citizens during the pandemic.

Purpose Statement in the Social Sciences

Rather than writing aims in a social science study, researchers often write a purpose statement. Purpose statements in mixed methods research are generally long and comprehensive. They need to be tailored to the type of mixed methods design being used. In general, there are four parts of a good script for a mixed methods purpose statement:

1. *Intent.* Convey the general intent of the study. What do you hope to have accomplished by the end of the project? Keep this to one concise sentence.
2. *Design.* Next, mention the specific mixed methods design that you will use in your study (e.g., experimental design). Give a brief definition of this design and then mention the types of quantitative and qualitative data that you will collect and how the two databases will be integrated or combined.
3. *Data.* Next describe data collection procedures, including theories to be tested, individuals to be studied, variables to be analyzed, and central phenomena to be examined.
4. *Rationale.* End the purpose statement with the rationale for collecting both quantitative and qualitative data. Are the qualitative data helping to explain the quantitative results (i.e., explanatory sequential design)? Will the quantitative and qualitative data be combined to develop a more complete understanding of the problem (i.e., convergent design)? Is the rationale of the study to have a better, more context-specific instrument (i.e., exploratory sequential design)?

Here are scripts for a convergent design and an explanatory sequential design. The researcher inserts information into the appropriate blanks:

Example 3. A social science script for a purpose statement for a convergent design

In this study, [quantitative data] will be used to test the theory of [the theory] that predicts that [independent variables] will [positively, negatively] influence the [dependent variables] for [participants] at [the site]. The [type of qualitative data] will explore [the central

phenomenon] for [participants] at [the site]. Both types of data will be merged for a complete understanding of the research problem.

Example 4. A social science script for an explanatory sequential mixed methods design

This study will address [content aim]. An explanatory sequential mixed methods design will be used, and it will involve collecting quantitative data first and then explaining the quantitative results with in-depth qualitative data. In the first, quantitative phase of the study, [quantitative instrument] data will be collected from [participants] at [research site] to test [name of theory] to assess whether [independent variables] relate to [dependent variables]. The second, qualitative phase will be conducted as a follow-up to the quantitative results to help explain these results in more depth. In this follow-up, the tentative plan is to explore [the central phenomenon] with [participants] at [research site] to understand better surprising or contradictory quantitative results in more depth.

WRITING QUANTITATIVE, QUALITATIVE, AND MIXED METHODS HYPOTHESES AND QUESTIONS

Within or after study aims or the purpose statement, researchers typically specify research questions or hypotheses. Just as in the aims or purpose statements, the research questions and hypotheses need to address quantitative, qualitative, and mixed methods questions or statements. In published journal articles reporting mixed methods research, both study aims or purpose statements and research questions are seldom included. Typically, one finds only study aims or purpose statements. For graduate theses and dissertations in which students need to demonstrate their mastery of research, one often finds both aims and purpose statements and research question and hypotheses. Likewise, in proposals for funding, researchers typically include both statements and hypotheses and questions, and the hypotheses and questions are placed under each aim as appropriate or stated after the purpose statement. Regardless of the form of disseminating the research, the role of research questions or hypotheses is to narrow down the purpose statement to questions or statements that will be specifically addressed in a project. In a mixed methods investigation, it is useful to have three types of questions:

1. Quantitative hypotheses or questions
2. Qualitative questions
3. Mixed methods research questions

Distinctions among these three forms are found in Table 4.1.

TABLE 4.1

Distinctions Among Quantitative, Qualitative, and Mixed Methods Questions and Hypotheses

Aspect	Quantitative Research Questions or Hypotheses	Qualitative Research Questions	Mixed Methods Research Questions
Form	Research questions or hypotheses (null or directional) with independent variable first and the dependent variable second	Research questions followed by subquestions using action-oriented words (e.g., exploring or generating)	Research questions that link to a specific mixed methods design
Intent	To narrow the study aims or purpose statement and to predict outcomes from theory or the literature	To narrow the study aims or purpose statement	To ask what the integration of the quantitative and qualitative data will accomplish
Key element	To relate variables or to compare groups in terms of outcomes	To explore one central phenomenon and to subdivide this exploration into subquestions	To integrate the databases
Placement in a study	To place it at the end of the introduction	To place it at the end of the introduction	To place it in the introduction or the methods section

Quantitative Hypotheses or Questions

As shown in Table 4.1, in a quantitative study, the researcher can write hypotheses or research questions. Hypotheses are predictions of outcomes based on the literature or on theories. They can be stated in a null form ("There is no significance between. . .") or in a directional form ("Higher motivation leads to higher achievement"). Hypotheses are a formal way of writing questions, and they are typically found in the experimental research components of a mixed methods study. An alternative to constructing hypotheses would be to state research questions ("Is higher motivation related to higher achievement?"). Today, many mixed methods projects use research questions rather than hypotheses.

There are some fundamental elements in writing quantitative hypotheses or questions. First, identify the variables, typically the major independent variables that influence the dependent variables or outcomes in a study. Variables are what is being measured. In quantitative research, one typically either compares groups (in regard to the dependent variable) or relates variables ("What factors contribute to low self-esteem?").

Second, the most rigorous quantitative studies base their hypotheses or questions on a theory or conceptual framework that explains or predicts the relationship between the independent and dependent variables. Third, researchers need to select either hypotheses or research questions; typically, both are not used in a single mixed methods study. Fourth, be clear about the variables and their intent. The two most important variables are the independent and dependent variables—indicating probable cause and effect. Following these are other variables such as mediating variables (those that stand between the independent variable and the dependent variable as a means of influence), moderating variables (which combine with the independent variable to influence the outcome, such as age × motivation influences achievement), and covariates that are controlled in a study for their impact, such as demographics like social economic status, years of education, and gender. Fifth, to assist readers, it is helpful to make the word order of variables—from independent to dependent—consistent in each research question or hypothesis. Here is an example of parallel word order:

Example 5. Example of word order from independent to dependent

- Does home resident location influence choice of a medical clinic?
- Does input from family members influence the choice of a medical clinic?

Qualitative Questions

In qualitative research, the study does not examine relationships among variables; rather, a single concept (called a "central phenomenon") is explored. Therefore, use questions rather than hypotheses in a qualitative study. The form for these questions involves a central question followed by subquestions. The central question is the most general question that could be asked about a phenomenon. It typically begins with the words *how* or *what* (instead of *why,* which is associated with quantitative research). It also focuses on a central phenomenon or idea that the researcher wishes to explore (e.g., "What does it mean to wait for a kidney transplant?").

When phrasing the qualitative question, the researcher also uses action-oriented exploratory verbs, such as *discover, understand, describe,* or *report*. These questions often change during data collection as the researcher learns how to best collect data in the field. Using a specific type of qualitative design may

influence the wording of the question as well. A grounded theory question might be, "What theory explains why people feel isolated in large organizations?" whereas a narrative research question might be, "What stories of survival do tsunami victims have?"

Mixed Methods Questions

This leads to the mixed methods question—a question that is new to most researchers and is not found in current research methods textbooks. My colleagues and I developed this question because in mixed methods research, a question is needed to be answered about the results of the integration of the quantitative and qualitative data. This meant that a specific mixed methods question needed to be posed in a study and answers provided to that question in the data analysis. In short, a **mixed methods research question** addresses what the researcher expects to find from the integration of the data. In any given mixed methods study, there may be more than one point of integration and therefore more than one mixed methods question. The key to identifying this question lies in looking closely at the mixed methods design, locating where integration occurs, and then posing a mixed methods question that addresses the potential outcome of that integration. The outcomes are not certain, but employing a specific design often leads to certain integration outcomes.

The following list represents typical mixed methods questions that relate to each of the types of designs (core and complex designs to be addressed in Chapters 5 and 6). In these examples, the researcher would replace the general type of data (e.g., quantitative or qualitative) with specific types of data in a project.

Example 6. Convergent mixed methods design

- To what extent do the qualitative findings confirm the quantitative results?

Example 7. Explanatory sequential mixed methods design

- How do the qualitative data explain the quantitative results?

Example 8. Exploratory sequential mixed methods design

- To what extent do the qualitative findings help to provide a contextualized quantitative assessment of a specified population?

Example 9. Mixed methods experimental design

- How do the qualitative findings enhance the interpretation of the experimental outcomes?

Example 10. Mixed methods participatory action research design

- How do the qualitative findings enhance understanding of the quantitative results and lead to community input?

Example 11. Mixed methods case study design

- What cases emerge for comparison when both quantitative and qualitative data are collected in a mixed methods study?

Example 12. Mixed methods evaluation design

- How do qualitative processes compare with quantitative outcomes in an evaluation?

As you look over these mixed methods questions, you will see that they are stated in the form of research questions with a focus on data analysis results, both quantitative and qualitative. In other words, these mixed methods questions are written from a "methods" orientation. Alternatively, they can be stated from more of a content-focused perspective, as in "How do the views of adolescent boys support their perspectives on self-esteem during their middle school years?" In this example, the "views" signify the qualitative portion of the study, and "perspectives on self-esteem" identify the quantitative portion.

Finally, probably the best possible mixed methods question is one in which both the methods and the content are combined. This is called a "hybrid" mixed methods question, and again, it needs to reflect the type of design being used. An example is the following:

Example 13. A hybrid mixed methods question with content and method

What results emerge from comparing the exploratory qualitative data about the self-esteem of boys with outcome quantitative instrument data measured on a self-esteem instrument?

In this example, we can easily determine the types of data being collected (qualitative data, instrument data) and perceive a focus on the content results of the study (self-esteem as measured by an instrument and during interviews).

RECOMMENDATIONS FROM THIS CHAPTER

This chapter began with advancing a template for writing a good mixed methods introduction to a study. This introduction included a topic, the problem, the existing literature, deficiencies in the literature, and the audience that would profit.

In an introduction, mention the mixed methods deficiency and that there is the need to collect both quantitative and qualitative data, as well as to draw insights from that integration of the two databases. Next, I turned to developing mixed methods study aims or research questions. Study aims are preferred in the health sciences and research questions are used in the social sciences. I provided examples of both study aims and research questions. In mixed methods research, we see three components: quantitative, qualitative, and mixed methods statements in the aims and purpose statements. Then, specific research hypotheses or questions narrowed the aims and purposes. Researchers need to know the form, intent, structure, and placement of these hypotheses or questions. Again, we saw quantitative, qualitative, and mixed methods statements or questions. Mixed methods questions were a new type of research question, which addressed what the researcher hoped to learn from the integration of the quantitative and qualitative databases. Mixed methods statements or questions further needed to link to the specific types of mixed methods design used in a study that will be elaborated in Chapters 5 and 6..

ADDITIONAL READINGS

For the general template for writing an introduction, see the following:

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Thousand Oaks, CA: SAGE.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: SAGE.

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach* (3rd ed.). Thousand Oaks, CA: SAGE.

For more information on developing research questions, see the following:

Plano Clark, V. L., & Badiee, M. (2010). Research questions in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social and behavioral research* (2nd ed., pp. 275–304). Thousand Oaks, CA: SAGE.

Tashakkori, A., & Creswell, J. W. (2007). Exploring the nature of research questions in mixed methods research [Editorial]. *Journal of Mixed Methods Research, 1*(3), 207–211.

Using Core Mixed Methods Designs

5

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How has the topic of mixed methods designs evolved over the years?
- What are the following core designs: a convergent design, an explanatory sequential design, and an exploratory sequential design?
- How do the three core designs differ in terms of their intent and their procedures?
- How does a researcher select which core design is most suitable for a mixed methods study?

EVOLVING MIXED METHODS DESIGNS

Designs are the procedures used to conduct research. My approach is to focus on the procedures related to methods—the data collection, the data analysis, and interpretation. It is possible to look at designs as encompassing the entire process of research from the philosophical assumptions, the questions, the data collection and analysis, the interpretation, and the writeup. Thus, my definition is much narrower than the process of research, and I acknowledge that the methods do relate to the other components of research.

Already you have been introduced to the concept of mixed methods designs. Before identifying a design, it is helpful to review the general state of research designs in the mixed methods field. There are many designs to choose from, and the names and types have multiplied over the years. When I wrote with Plano Clark the latest edition of our mixed methods book (Creswell & Plano Clark, 2018), we reviewed how our thinking had changed in recent years since we began

to actively discuss and convey information about designs (Creswell, Plano Clark, & Guttmann, 2003). We noted the following changes during the past 15 years:

1. We have maintained in our writings a "typology" approach that focuses on the types of mixed methods designs. Others have taken the stance that rather than focus on the methods part of the research process, the discussion of designs needs to be framed much larger in terms of the methods and their interconnecting parts (e.g., goals, questions, validity), an interactive model of research design (see Creamer, 2017; Maxwell, 2012). Our focus has been to discuss designs primarily as methods, recognizing that the designs do reside within a larger process of research.
2. We now feel that the design may emerge during a study rather than always being preplanned. Funding agencies, the demands of resources or staff, or shifting priorities of participants in a study may require changing the design. It is best to view designs as emerging in a study and not solidly fixed in place prior to conducting the study.
3. We have now limited our discussion to three core types and four complex designs. This number is considerably lower (and more parsimonious) than our previous discussions. With many design possibilities emerging over the years, researchers are often confused about what design to choose, and it is better to consider a small number of designs and to allow researchers to develop variations within these types.
4. We have slightly changed the names of our designs (e.g., from a "concurrent design," which emphasizes sequence of, to a "convergent design"), which highlights the *intent* to merge the data. Thus, this name change, for example, focuses more on the "intent" for collecting both quantitative and qualitative data and less on the sequence of the two types of data and their emphasis and priority within a study. This change reflects our thinking that timing and priority are vague, often misunderstood terms.
5. We limited our discussion to two types of designs, core designs and complex designs, and emphasize that all mixed methods studies have one or more core designs. Researchers can then engage in a complex design by embedding these core designs within larger processes (e.g., intervention trial or experiment) or frameworks (e.g., participatory action research) (see Chapter 6 for a discussion of complex designs).
6. Two elements related to design have become much more important in my thinking: integration and metainferences. We emphasize in our recent mixed methods book (Creswell & Plano Clark, 2018) the importance of "intent" in selecting a design. Thus, in choosing

a design, we are primarily interested in the reason why the researcher combined or mixed the quantitative and qualitative data. This focus is consistent with the discussion about designs advanced by Guest (2012), who called this "intent," the "point of interface" between the two data sets (p. 146). Researchers intend to integrate the two databases through purposes such as comparing or connecting them. In more complex designs (see Chapter 6), these core purposes for conducting mixed methods research are embedded into larger frameworks or processes. Our focus on metainferences, on the other hand, highlights the value of using mixed methods research (see Chapter 8 for more detail about integration and metainferences).

Generally, I feel that mixed methods researchers develop designs that are too complicated in name and procedures. It is always helpful to start with a simple design and understand what can be accomplished by using it. Finally, it is important to begin with a core design, to clearly identify the reasons for using it, and to draw a picture (or diagram) of the design (see Chapter 7 for drawing the diagram of a design). I will start then with the three core designs that are found in mixed methods studies.

UNDERSTANDING THREE CORE DESIGNS

All mixed methods studies should include one or more of the core designs. As introduced in Chapter 1, these designs are the convergent design, an explanatory sequential design, and an exploratory sequential design. Many of the published mixed methods studies use one of these three designs. I always say that when looking at a published mixed methods study, I look first for the collection of both quantitative and qualitative data and then for the underlying core design being used that relates these databases. The author may not convey this design in simple, straightforward ways, but it nonetheless does exist and is at the heart of the mixed methods study. In fact, whatever design is being used, it becomes a framework for the entire mixed methods project. Knowing the design, then, relates to the other components of the study. For example, the design relates to the wording used throughout the research, such as in the draft title for the project, the mixed methods question, the sampling strategies for data collection, the integrative analysis, the metainferences, and the writing structure used to disseminate the study. Some people place emphasis in mixed methods research on the research questions, or the ethics or validity, but I tend to emphasize research method designs as a core feature of good research. The three core designs are as follows:

- Convergent design
- Explanatory sequential design
- Exploratory sequential design

The Convergent Design

The *intent* of a convergent design is to compare the results of the quantitative and qualitative data analyses. Initially, this design was called a "concurrent" or "parallel" design, but we have shifted our name to focus on "intent" rather than on "process," since the intent is the central feature of this design. In the convergent design, both forms of data provide different insights, and their combination contributes to seeing the problem from multiple angles and multiple perspectives. In short, quantitative results yield general trends and relationships, which are often needed, while qualitative results provide in-depth personal perspectives of individuals. Both are useful results, and their combination adds up to not only more data but also a more complete understanding of the problem than what would have been provided by each database alone. Thus, as a result of using this design, the mixed methods researcher can advance multiple perspectives or even validate one database with the other. This is the logic behind a convergent design.

This comparison is accomplished through the *process of merging* the two databases. The merging of the two databases constitutes the integration in this design. Simply, the researcher looks for convergence of the data—hence the name of this design, a convergent mixed methods design. I can identify steps in the process of making a comparison and merging the data:

1. Begin by collecting and analyzing the quantitative data and the qualitative data separately.
2. Merge or bring together the two databases. This can be done in several ways. After the results have been compiled, the interpretation or inferences drawn from the two databases can be brought together in a *discussion* where they are arrayed side by side. For example, the quantitative results may be reported first, followed by the qualitative results. A follow-up discussion then occurs, *comparing* the results from the two databases by displaying them one after the other (called side-by-side comparison). This side-by-side comparison can be accomplished through a discussion in the report or by the use of a joint display, which arrays the quantitative and qualitative data in a table or graph, to be discussed in Chapter 8. Another approach is data transformation—to transform one of the databases into the other form so that they can easily be compared. For example, typically this involves transforming the qualitative results into numeric data. Counts could be made of the number of times the various themes appear in the data derived from the qualitative analysis, and these numeric values could present new variables that are entered into the quantitative database.
3. After the results have been merged, make a comparison from the two results to determine whether they converge or diverge. This is the

mixed methods integration data analysis. If the results diverge, then explain why they occurred. Some reasons to look for would be the lack of valid quantitative measures, poor qualitative findings, or the lack of parallel questions to facilitate data comparisons.

4. From this comparison, the researcher then draws metainferences, interpretations, or conclusions about what was learned from the integration analysis (beyond the inferences from the quantitative results and the qualitative findings) from the merging of the two databases. These metainferences, in turn, can be compared to practice, existing literature, or theories. The researcher then states the value of the metainferences for understanding the research problem.

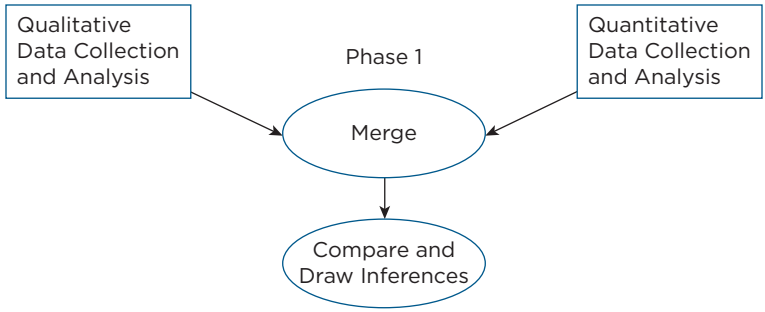
The convergent design is useful for researchers who need an efficient way to gather both forms of data while they are in the field. Researchers come to me often with this design because a natural inclination is to view mixed methods as simply combining the two databases. However, this is not an easy design. Researchers need to know how to merge two databases, such as text data (or open-ended) and numeric data (or closed-ended), that are not typically combined in research, and to do so may be counterintuitive. Researchers need to be familiar with the procedures of creating joint displays or making side-by-side comparisons. Further, in order to compare the results of the two databases, the questions should ideally be similar for both the quantitative and qualitative data collection. For example, if one measures depression quantitatively on a scale, then the interview questions need also to focus on learning about depression qualitatively. This design also raises the possibility of introducing researcher bias when qualitative data collection occurs at roughly the same time as the quantitative data collection. This might be overcome by the researcher introducing a qualitative data collection procedure, such as participant journaling, that does not involve the active intervention by the researcher during quantitative data collection. As shown in Figure 5.1, the researcher collects and analyzes both quantitative and qualitative data and then merges the results to make an interpretation. I call this design a single-phase design because both forms of data are collected at approximately the same time.

The Explanatory Sequential Design

The *intent* of the explanatory sequential design is to explain quantitative results with qualitative data. The researcher begins with a quantitative **strand** (a *strand* refers to either the quantitative or qualitative component of a study) for collecting and analyzing data and then follows up the results with collecting qualitative data. This is the *process of connecting* the two databases with the quantitative results with qualitative data collection. This is the point where integration of the two databases occurs. Quantitative results yield statistical significance,

FIGURE 5.1

Convergent Mixed Methods Design



confidence intervals, and effect sizes and provide the general outcomes of a study. However, when we obtain such results, we often do not know why the findings occurred. The qualitative data help us to understand the quantitative results in more depth. The results that may need follow-up are significant, nonsignificant, unexpected, or outlier findings. Hence, the quantitative results can help form the qualitative follow-up questions. The results can also help to identify appropriate individuals and the questions to ask participants in the qualitative follow-up data collection. Also, because this design emphasizes a follow-up, it is sequential, and since it explains the quantitative results in more depth, it is explanatory.

Conduct this design by following these procedures:

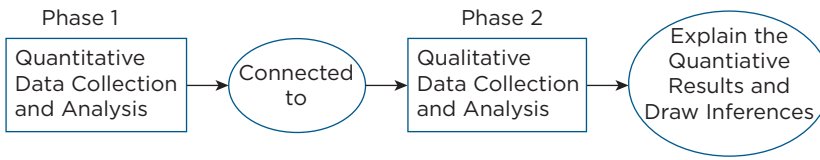
1. Collect and analyze quantitative data in the first phase.
2. Examine the results of the quantitative analysis to determine (a) what results will need further exploration in the second, qualitative phase and (b) what participants to follow up with who can best answer the questions and what questions to ask them.
3. Conduct qualitative data collection and analysis in a second phase to help explain the quantitative results.
4. Analyze how the qualitative findings help to explain the quantitative results. This is the mixed methods integration analysis.
5. From this mixed methods integration analysis, draw metainferences and relate them to practice, the literature, or theory. Explain how the metainferences add insight in understanding the research problem.

The strength of this design lies in the fact that the two phases build upon each other so that there are distinct, easily recognized stages of conducting the

design. This mixed methods design is popular among graduate students and beginning researchers because of the clear division between the two phases and their easy sequence in a graduate student research project. It is also popular among researchers who have a quantitative background, because the study begins with a quantitative phase. It is challenging to conduct, however, because it takes time to implement two distinct phases in sequence. Another challenge is determining which quantitative results need further explanation. Choices for the researcher include following up on participants with certain demographics, expanding the investigation to explain important variables (or variables that surprisingly turned out to be nonsignificant), and looking closely at outlier cases from the quantitative results. Choosing a qualitative sample and asking the right qualitative questions to provide a clear follow-up to the quantitative results present challenges in using this design.

Figure 5.2 provides a basic diagram of the procedures in the two-phase explanatory sequential design. We see that the procedures start with a quantitative data collection and analysis, and then the researcher analyzes the results and decides what type of follow-up information is needed and who can best provide that information. Then, in the last phase, the researcher collects and analyzes the qualitative data that will help explain the initial quantitative results in more depth.

FIGURE 5.2
Explanatory Sequential Mixed Methods Design



The Exploratory Sequential Design

The *intent* of the exploratory sequential mixed methods design is to develop measures and instruments that are sensitive to the needs of a specific cultural population or sample. When studying populations that are underrepresented or outside the mainstream of Western society, we cannot simply bring in measures and instruments from our Western culture. We need to first learn about the needs of the cultural group and then adapt our measures and instruments to best address their needs. Thus, an exploratory sequential design is well suited for this objective. It begins with an exploratory qualitative initial phase, and then, based on the information collected in that phase, the researcher adapts measures

or instruments to fit the population and finally tests the adapted measures or instruments with a sample of the population. This type of design is popular in global research, especially global health research, where investigators need to assess community needs before using instruments that may be a poor fit.

In this design, the *process of connecting* occurs by linking the initial qualitative phase with a second quantitative design phase. Thus, integration occurs at this point. We see a three-phase project: an initial qualitative exploration phase, a design second phase to adapt measures and instruments, and a third testing phase to administer the adapted instruments. What can be adapted in the second phase, for example, may be an existing questionnaire, activities planned for an experiment or intervention trial, the variables used in a study, a web tool, or a website.

To conduct this design, follow these procedures:

1. Collect and analyze the qualitative data.
2. Examine the results from the qualitative analysis (e.g., the codes, the themes, the quotes) and use the information to design or redesign a quantitative component, such as new or adapted measures, new instruments or questionnaires, new intervention activities, or web apps or websites. The idea is that the new quantitative component improves on what measures are already available because it will be grounded in the actual experiences of participants in the study.
3. Use the new or adapted quantitative component by testing it out. This means that the new measures will be put into an existing quantitative database. It may mean that the new instrument is tested for the validity and reliability of its scores. It may also mean that a new element is placed into an experimental trial and used as part of the intervention (or as new pre- and posttest measures). These are some of the possibilities.
4. The final step, then, is to draw inferences as to how the new quantitative assessment (e.g., measures, instruments, or activities) improves upon the existing set of variables by its sensitivity to the culture and context of the participants, provides a new and better contextualized instrument, or adds helpful activities into the intervention so that it enhances the workability of the intervention with a particular group of participants. In addition, because the qualitative data are drawn from a small sample in the first phase, the test of the new quantitative component can provide insight into whether the initial qualitative results can be generalized to a large sample in the third quantitative phase. The inferences can be compared with existing literature, practice, and theory, and the researcher can comment on the value of the inferences to improve insight into the research problem.

With three phases, this is a challenging design to conduct. Like the explanatory sequential design, this design takes time, and with three phases, this design expands the time needed to conduct the research. This design also requires an initial qualitative data collection to obtain a sense of the community or participant needs, and this requires building rapport with the sample and population to gain their trust. This design also presents the challenge of linking the initial qualitative findings with the design of the second phase quantitative feature.

Take, for example, using this design to adapt or develop a quantitative survey or questionnaire. The exploratory qualitative findings yield specific quotes from individuals, codes as aggregations of quotes, and themes as the collection of codes. In the design of the questionnaire, the qualitative themes could be used for scales on the questionnaire. The qualitative codes could be made into variables and the specific quotes used to form items or questions on the instrument. In this way, the first phase qualitative data analysis can be used to specifically design components of the questionnaire.

Then, in this application, an additional challenge emerges. The actual design of the questionnaire involves distinct steps to make the instrument solid psychometrically. One can consult the book by DeVellis (2012) on instrument design to see the steps. I have taken his steps and modified them slightly, and I would recommend developing a good questionnaire by:

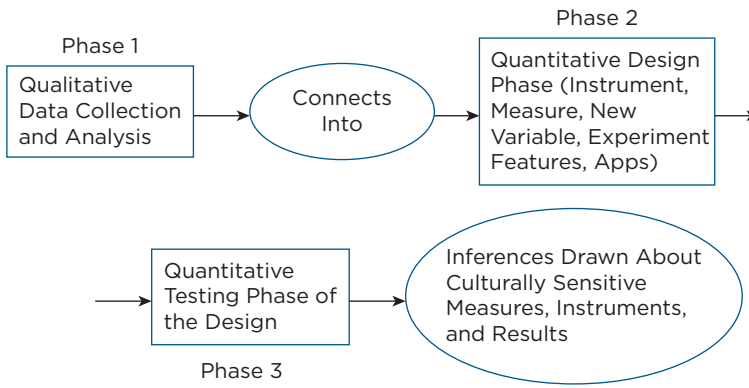
1. Reviewing the literature/obtaining expert panel advice
2. Identifying possible items
3. Pretesting the items with a small sample using exploratory factor analysis
4. Conducting reliability analysis of the scales
5. Administering the survey to a large sample
6. Conducting confirmatory factor analysis of the results
7. Using structural equation modeling to identify latent variables
8. Looking for evidence of construct validity

These numerous steps indicate a rigorous process for survey development. Likewise, time and skills are needed if the design phase consists of planning a website or identifying intervention activities for an experiment.

Although this design is challenging, it also has many positive strengths. It is rigorous and advances a sophisticated mixed methods design. Further, it shows a sincere interest by the researcher in relating the mixed methods study to cultural norms of populations and groups in other countries. Also, because the study begins with a strong qualitative component, I find that researchers who have training and experience in qualitative research often seek out this design for use.

A diagram of the procedures for the exploratory sequential mixed methods design is shown in Figure 5.3. This diagram portrays three connected phases with an end point of testing a quantitative measure or instrument well adapted to the sample or population being studied.

FIGURE 5.3
Exploratory Sequential Mixed Methods Design



CHOOSING A MIXED METHODS CORE DESIGN

I would recommend starting a mixed methods study by identifying the core design. To select a core design, I would consider the "intent" for collecting both quantitative and qualitative data. Is the plan to compare the two databases or have one build on the other? This will lead down the path to either a *convergent* design (merging the data) or a *sequential* design (connecting the data). Also, the *convergent design* supports the equal value of both quantitative and qualitative research. The *explanatory sequential design* is a good choice when the researcher has an existing instrument (with good validity and reliability checks) to use. On the other hand, if measurement instruments are not available or the questions to be asked of participants are not known (e.g., not much information is available about the cultural group), then the *exploratory sequential* design would be a good choice. Other factors play as well into the selection decision. I would consider the skills and orientation that the researcher brings to mixed methods research. If the researcher's background resides in a stronger quantitative orientation (either through personal interest or the discipline of the field), then I would encourage the selection of a design that starts with quantitative research (i.e., an explanatory sequential design). If the researcher has a strong orientation

toward qualitative research or needs to incorporate the cultural norms of a site or population, I would suggest an exploratory sequential design that begins with qualitative research. I would also assess whether skills are stronger in quantitative research than in qualitative, or vice versa. Finally, I would recommend looking into the literature in a particular field to see what types of mixed methods designs are being used.

RECOMMENDATIONS FROM THIS CHAPTER

The following are specific recommendations that flow from ideas in this chapter. In initially thinking about a design for a mixed methods study, consider one of the three basic designs. Probably the easiest to execute would be the explanatory sequential design, followed by the convergent design and then the exploratory sequential design. This last design is more complicated because it requires more phases in the study and a wide array of skills.

Start thinking about the design not from the standpoint of timing (what comes first, what comes second) or emphasis (whether qualitative or quantitative has greater emphasis in the project), because these selection criteria vary considerably, but rather decide based on *intent,* the intent of collecting, analyzing, and integrating the two databases and the questions. Is a comparison of the two databases needed (convergent design)? Is an explanation of the quantitative results with qualitative data needed (explanatory sequential design)? Is there a need to make the quantitative assessment specific to a sample or population so that an initial qualitative exploration is needed (exploratory sequential design)?

After deciding on a core design, consider the *process* for conducting the design and look into the steps provided in this chapter. Choose a design based on these factors: the intent (what you hope to accomplish), background and skill level, needs of the site or population, and the orientation toward design found in a particular field or discipline.

ADDITIONAL READINGS

For readings about the core mixed methods designs, see the following:

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: SAGE.

Guest, G. (2012). Describing mixed methods research: An alternative to typologies. *Journal of Mixed Methods Research, 7*(2), 141–151. DOI: 10.1177/15586898|246|179

On instrument or scale design, see the following:

DeVellis, R. F. (2012). *Scale development: Theory and applications* (3rd ed.). Thousand Oaks, CA: SAGE.

For good examples of the types of core designs that I would recommend, see the following:

(Convergent design)

Wittink, M. N., Barg, F. K., & Gallo, J. J. (2006). Unwritten rules of talking to doctors about depression: Integrating qualitative and quantitative methods. *Annals of Family Medicine, 4,* 302–309. DOI: 10.1370/afm.558

(Explanatory sequential design)

Ivankova, N. V., & Stick, S. L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study. *Research in Higher Education, 48,* 93–135. DOI: 10.1007/s11162-006-9025-4

(Exploratory sequential design)

Betancourt, T. S., Meyers-Ohki, S. E., Stevenson, A., Ingabire, C., Kanyanganzi, F., Munyana, M., . . . Beardslee, W. R. (2011). Using mixed-methods research to adapt and evaluate a family strengthening intervention in Rwanda. *African Journal of Traumatic Stress, 2*(1), 32–45.

Using Complex Mixed Methods Designs

6

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How does a researcher embed a core design into a complex framework or process?
- How do you embed core designs into four types of complex mixed methods designs: an experiment or intervention, a participatory action research study, a multiple case study, and an evaluation study?
- How do you choose which complex design is best for a study?

The difficulty of looking at mixed methods research as comprising one or more of the three core designs is that often the research is much more complex than simply combining the quantitative and qualitative databases. This was brought home to me several years ago in one of my workshops, where a participant said that his project did not fit cleanly with any of the three core designs. Thus, my thinking about designs started to move toward the combination of the three core designs into larger frameworks or processes in research. My thinking was reinforced by the discussion of Plano Clark and Ivankova (2016), who discussed "advanced application" designs. **Frameworks or processes of research** are procedures to research with distinct steps or stages. Examples would be conducting an experiment or carrying out a participatory action research study. These procedures have specific steps that can be identified, and mixed methods core designs can be used (or embedded) within them.

EMBEDDING CORE DESIGNS INTO COMPLEX FRAMEWORKS OR PROCESSES

Complex designs are those in which researchers intersect a core design within a primary quantitative or qualitative method (e.g., an experiment), another methodology (e.g., evaluation process), or a theoretical framework (e.g., a participatory action research framework). In that same year, Nastasi and Hitchcock (2016) discussed program evaluation within the context of mixed methods research. They felt that linking the core designs to a larger process or framework could lead to a better array of design possibilities. The question then arose, how do we think about linking the core designs into these processes and frameworks?

The first issue in answering this question relates to the appropriate name for these designs. Certainly, "advanced applications" (Plano Clark & Ivankova, 2016), "complex" applications (Nastasi & Hitchcock, 2016) "advanced designs" (Creswell & Plano Clark, 2018), and "scaffolded mixed methods research designs" (Fetters, 2020) are all possibilities. All terms would work, but these designs are indeed "complex" because one or more core designs are embedded within the larger process or framework. Thus, I tend to use the term *complex* to describe them and will do so in this chapter, recognizing that researchers may see all types of mixed methods designs as having a complexity to them because of the multiple forms of data and data analysis.

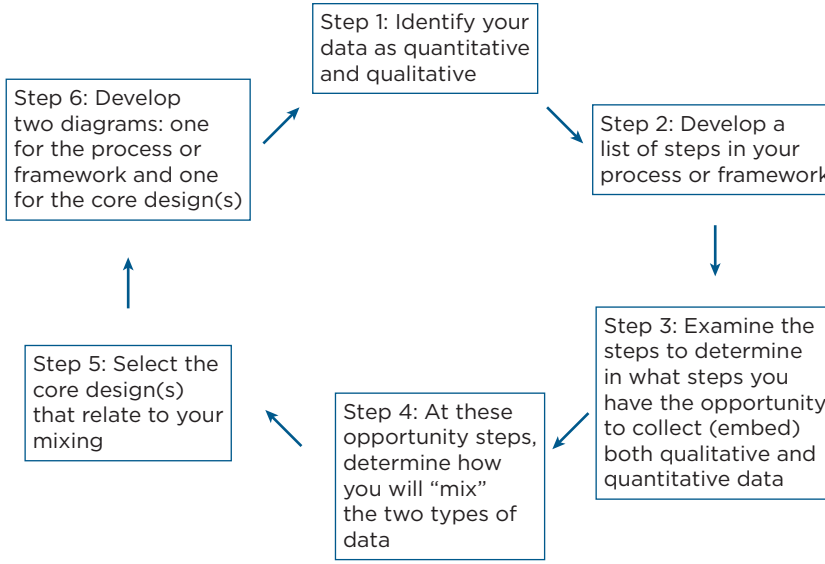
The next issue was then to consider how to go about linking the core designs into the larger processes or frameworks. Deciding on a linking procedure also had implications for how to draw a diagram, as I will address shortly in Chapter 7. As I thought about this linking procedure, an idea occurred to me. I reflected on the evaluation model presented by Nastasi and Hitchcock (2016) as well as the participatory action research model presented in Ivankova (2015). The idea was to embed the core design into the steps in the process or framework. After this, I drew a diagram of how this might look, as shown in Figure 6.1.

The steps I would recommend are as follows:

1. Identify and list the quantitative and qualitative data being collected in the study.
2. Identify the framework or process used in the project and list the steps that will be followed in the project.
3. Examine the steps in this process or framework, and identify the steps in which both quantitative and qualitative data will be collected.

FIGURE 6.1

Process Model for Embedding Mixed Methods Core Designs Into Complex Designs



These are the steps in which an opportunity to use core mixed methods designs exist.

4. Determine how the quantitative and qualitative data will be "mixed" or integrated at these steps.
5. Identify one or more core designs for this mixing.
6. Develop a diagram that shows the steps in the framework or process as well as one that indicates where the core designs are used in the steps. Also, develop a diagram for each of the core designs.

As indicated in Figure 6.1, an early step in your research is to understand the steps that will be involved in your project. This means reading books and articles on your process, whether it is an experiment, an evaluation, or some other process. Many different processes are being linked to mixed methods core designs, such as complexity theory, geocoding, or social network analysis. The link of mixed methods into processes and frameworks extends well beyond

these that I have mentioned. Mixed methods research is no longer seen as a stand-alone methodology. However, I will illustrate complex designs using four examples frequently found in the literature:

- Embedding core designs into intervention trials or experiment (hereafter called experiments)
- Embedding core designs into participatory action research studies
- Embedding core designs into multiple case studies
- Embedding core designs into evaluation studies

EMBEDDING CORE DESIGNS INTO EXPERIMENTS

The *intent* of a **mixed methods experimental design** is to study a problem by conducting an experiment or an intervention trial and adding qualitative data to augment the study (O'Cathain, 2018). At the center of this mixed methods design lies an experiment or intervention consisting of identifying multiple groups (e.g., control and experimental groups), testing a treatment with the experimental group, and determining if the treatment has an effect on the outcomes. The control group, not receiving the treatment, should not change in terms of the outcome. Within this pre- and posttest two-group model with an experimental intervention, we can place qualitative data. These qualitative data can serve a number of purposes, and mixed methods researchers think about the placement of the data within the experiment, such as before the experiment, during the experiment, after the experiment, or at multiple times during the experiment (see Creswell, Fetters, Plano Clark, & Morales, 2009). It can be added into the experiment *before* the experiment begins for the purpose of, for example, recruiting individuals to the trial by conducting interviews or to help design the intervention procedures that may likely affect participants in the experiment. In this case, the researcher is embedding an exploratory sequential core design within an intervention trial because the qualitative exploration precedes the trial. Qualitative data can be embedded in *during* the experiment to study how participants are experiencing the intervention activities and whether these activities might have negative or positive implications for the trial. In this case, the researcher is using a convergent core design because the qualitative data flow into the trial at the *same time* the quantitative trial is under way. Or the qualitative data can be added into the trial *after* the experiment is over in order to follow up on the outcomes and help explain them in more detail than provided by the statistical results. This would constitute using an explanatory sequential core design within the experimental design.

To conduct this design, the *process* can follow these procedures:

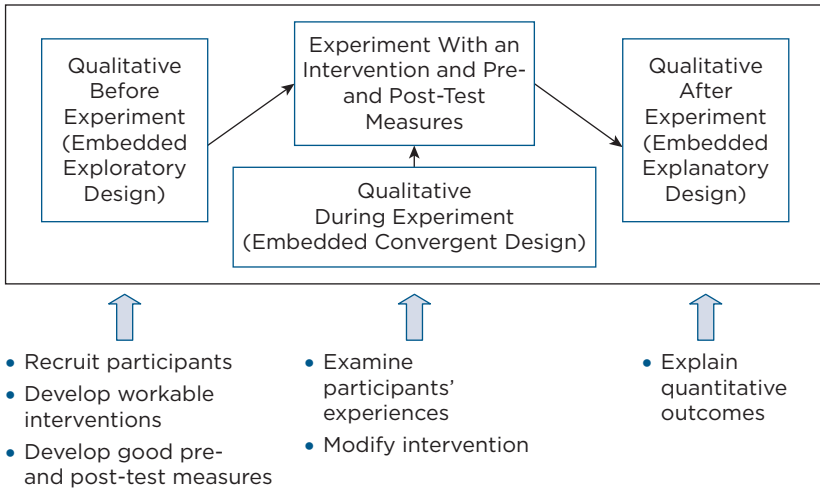
1. Design the experiment and determine what type of experiment will be conducted (e.g., single group, multiple groups, pre- and posttest, posttest only, etc.).
2. Look closely at the type of experimental design and determine when the qualitative data will be embedded in the experimental trial. Identify the specific reason(s) for adding qualitative data to the experiment. Determine the type(s) of core designs to be embedded in the experiment. Draw a diagram of the process of the experiment and where the qualitative data will be embedded. Draw diagram(s) of the core designs used in the experiment.
3. Conduct the experiment: Assign groups to control and treatment (if used), determine pre- and posttest measures, gather the data, and assess whether the treatment had an effect.
4. Analyze the qualitative results and draw metainferences about how the qualitative data helped to augment or strengthen the experiment.

This design is challenging because the researcher needs to know how to run a rigorous experiment that employs standards such as random assignment, a high quality of "dosage" of the treatment, controls for threats to validity, and so forth (see Creswell & Creswell, 2018). It is also challenging because the researcher needs to determine where to collect qualitative data in the process of research and whether to gather qualitative data at multiple points in the design. Gathering qualitative data at multiple points adds to the time and resources needed to conduct the study. When investigators gather qualitative data during the experiment, researcher bias needs to be closely monitored so that the intrusion of qualitative data collection does not unduly influence the outcomes in the trial. To address this, in some cases, the investigator gathers what is called unobtrusive data, such as journals kept by participants *during* the trial and analyzed only after the trial concludes. On the positive side, this design is a rigorous one and popular in the health sciences, where the randomized controlled trial is the gold standard for research. In many articles, authors are critical of experimental trials, and this design adds elements into the trial that make the results more believable and that factor the human element into laboratory-contrived research studies.

There are many ways to draw a diagram of the procedures for a mixed methods experimental design. Consistent with the procedure I have identified for embedding a core design into a process (i.e., an experiment), I have placed in this diagram the experiment at the center and indicated the reasons at the different phases for adding qualitative data into the study. See Figure 6.2 for an illustration of this design.

FIGURE 6.2

Mixed Methods Experimental or Intervention Design



EMBEDDING CORE DESIGNS INTO PARTICIPATORY ACTION RESEARCH STUDIES

The *intent* of a mixed methods participatory action research design is to collect both quantitative and qualitative data, to involve participants in all phases of the design of the study, and to integrate the data to bring about change in a community (see Ivankova, 2015). This participatory approach can involve social justice aims, such as to improve equality for women, address ethnic or racial injustices, or improve the inequalities for social, disability, or lifestyle orientation groups. At the center of these mixed methods studies would be one or more core designs (i.e., convergent, explanatory sequential, or exploratory sequential), but the investigator would embed the core design into the larger framework.

The process involved in this type of mixed methods design is as follows:

1. Identify the stages in the participatory action research model (or social justice model).
2. During one or more stages, collect both quantitative and qualitative data. These stages become opportunities for embedding mixed methods core designs.
3. Determine the core designs to be embedded in these stages. Draw a diagram of the participatory action research model and indicate at what stages the core designs will flow into the model. Also draw separate designs of the core designs in the study.

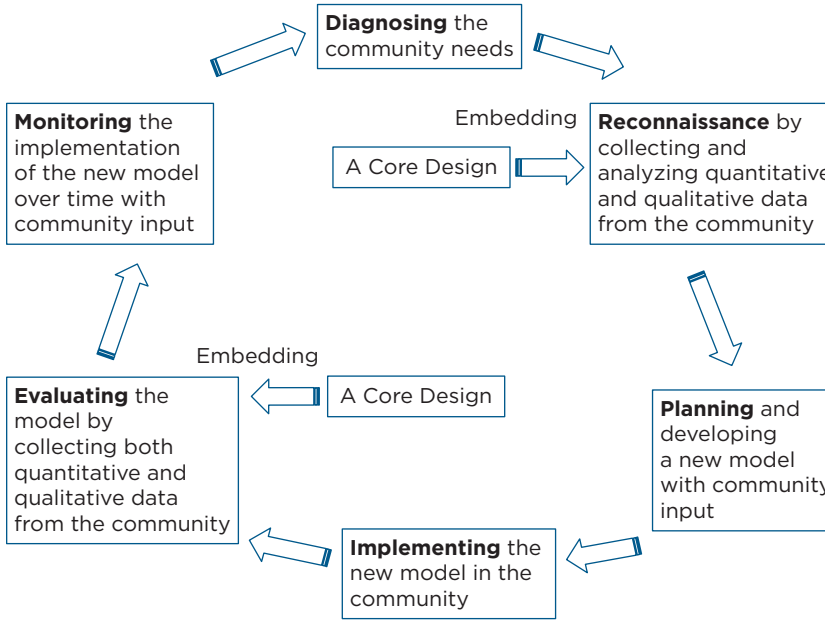
4. Analyze the results from each stage in the model and the results from integrating the data in the core designs.
5. Discuss how the core mixed methods design enhanced information for the community or helped to address injustices.

The advantage of this type of design is that the outcomes are intended to help a marginalized group, disadvantaged individuals, or a community. The call for change comes in the final section of the study, in which the researcher takes a stand about improving the community (e.g., a social justice outcome). This design is popular in countries around the world in which individuals live in a state of inequality and marginalization. The challenges in using this design lie in deciding what participatory framework to use, how to incorporate it in many phases of the study, and how to include it in such a way that it does not further marginalize participants or the community.

The *process* of conducting this type of design is shown in Figure 6.3. At the center of this design are the steps in the process of conducting a participatory action research study with the involvement of the community at many phases

FIGURE 6.3

Embedding Core Designs Into Participatory Action Research Study



Source: Adapted from Ivankova (2015).

of research. At two points in the process, the researcher has an opportunity to collect and analyze both quantitative and qualitative data: at the reconnaissance and the evaluation stages. These stages become points for embedding core designs, and as shown in Figure 6.3, the first embedded design is at the reconnaissance stage and the second at the evaluation stage. Thus, multiple core designs are embedded into the participatory action research study.

EMBEDDING CORE DESIGNS INTO A MULTIPLE CASE STUDY

The *intent* of a mixed methods multiple case study is to either *document* the cases using both quantitative and qualitative data and their integration or *generate* cases based on both forms of data and their integration (see Creswell & Plano Clark, 2018). Thus, I see case studies as either inductively or deductively derived. The most popular form is to inductively derive the cases by collecting and analyzing both quantitative and qualitative data, to integrate the two databases, and, from this integration, to form one or more case studies that then can be compared (see Shaw et al., 2013). It is possible to have only a single case, but I feel that multiple cases present a more complex design. If the cases are deductively derived, the researcher starts with specific cases identified, then gathers both quantitative and qualitative data (and their integration) to demonstrate differences or similarities among the cases.

The *process* of developing a mixed methods multiple case study involves these specific procedures:

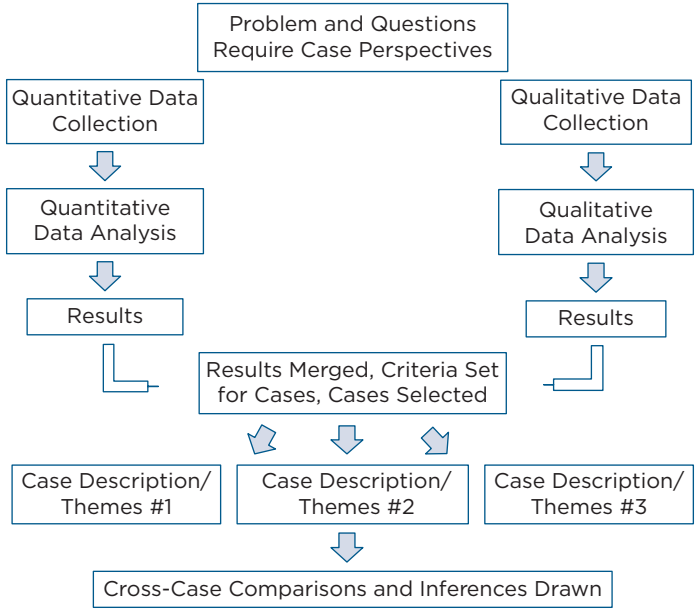
1. Decide on the inductive or deductive approach to forming cases. Identify the boundaries of these cases (Stake, 2006). I will use the inductive approach as an illustration.
2. Formulate a problem and research questions related to making a comparison of several cases.
3. Identify the steps to be taken to form the cases (inductive approach). Look at these steps to determine where opportunities exist to collect both qualitative and quantitative data. Draw a diagram of the process of inductively deriving the cases.
4. Merge these two databases to identify cases. Determine criteria for the formation of the cases. Draw a diagram of the core mixed methods design. Identify several cases that differ in terms of their data from the merged process.
5. Specify three or four cases, describe each case, and then complete a cross-case analysis to indicate similarities and differences among the cases.

The advantage of this type of mixed methods design lies in being able to construct multiple cases (in the inductive approach) not from the literature or theory but from quantitative and qualitative data. Cases are familiar to many researchers, and to indicate various types of cases about a problem is a way to see the different approaches that exist in practice. The challenge in this design lies in determining whether it is best to start or end with cases. Starting with cases may be seen as a quantitative approach to mixed methods research, whereas ending with cases indicates more of a qualitative approach. The field and discipline of the researchers, as well as their orientation, may dictate which approach would be best given acceptance of a study or the publication of a study. Further, in this type of mixed methods design, the researcher needs to understand case studies and how they are formed, described, and analyzed (Stake, 2006). A challenging aspect also is setting the criteria for differentiating among the cases before they are compared.

I have chosen to illustrate a mixed methods case study using a model that I frequently see in the health sciences. As shown in Figure 6.4, this diagram indicates a convergent core design embedded within an inductive case study process. The researcher gathers both quantitative and qualitative data, merges the results, and, from these results, forms multiple cases for comparison. The number of multiple cases may differ from one study to another. It is possible, too, to represent a mixed methods case study using sequential core designs.

FIGURE 6.4

Embedding a Core Converge Design Into a Multiple Case Study



EMBEDDING CORE DESIGNS INTO AN EVALUATION STUDY

The *intent* of a mixed methods evaluation study is to conduct a study over time that evaluates the success of a program or activities implemented into a setting (Nastasi & Hitchcock, 2016). It becomes evaluative when the overall intent is to assess the merit, value, or worth of a program or set of activities. During the many phases of the evaluation, opportunities exist for collecting and integrating both qualitative and quantitative data. The phases of the evaluation follow steps typically taken in evaluation projects, such as conducting a needs assessment, taking a theory and conceptualizing it to a specific program, identifying measures and instruments to assess the outcome of the program, conducting the program, and then following up to determine participants' responses to the program. In one or more of these phases, the opportunity exists to collect both quantitative and qualitative data. Within a phase, both types may exist, opening up the opportunity for a mixed methods core design. Between the phases, the opportunity exists as well.

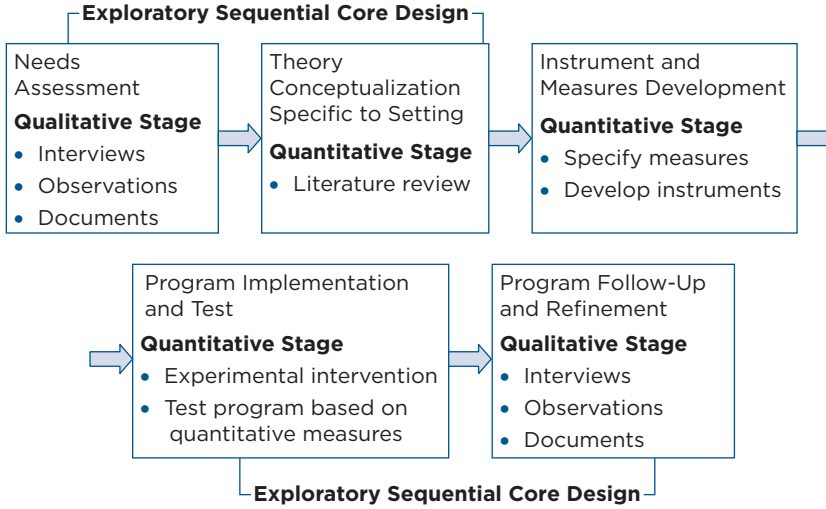
To conduct this design, follow these procedures:

1. Identify what program needs to be evaluated and the team members who will conduct it.
2. Form the questions to be asked about evaluating the program. Consider both the participants' responses to the program as well as the measured outcomes.
3. Identify the phases in the evaluation using an evaluation model. These might include a needs assessment, theory conceptualization, specification of measures and instruments, testing out the program using the measures and instruments, and following up to help explain the program implementation test.
4. Look at embedding a core design or several core designs in distinct stages of the evaluation phases. Alternatively, consider how core designs can connect different phases of the evaluation. Consider the types of core designs to be embedded. Draw a diagram of the evaluation model and the embedded core designs within the model. Draw separate diagrams of the core designs.
5. Conduct the evaluation at each phase, and complete the mixed methods core designs at different phases. Indicate how the core designs help to strengthen the evaluation process (e.g., provide personal experiences to the outcome measures of the evaluation process).

The strength of embedding core designs into an evaluation study lies in its systematic procedures for documenting the success of a program. It can involve team members who have both quantitative and qualitative (or mixed methods) skills. It is also a complex type of design, conducted over time, that would be seen by funding agencies as a rigorous, multifaceted project. One challenge for using this design is that it is not suitable for the "single" researcher but often requires a team to conduct the study (with the support of stakeholders). Finding funding and time for researchers to engage in this type of project may be difficult. Also, team members need to be coordinated to facilitate their working together and to ensure clarity about the overall evaluation goal of the project. Clearly, the use of this design requires understanding the evaluation process and the steps involved (see Rossi, Lipsey, & Freeman, 2004). Finally, one stage leads to another, so the team needs to consider how one stage contributes to the next stage. This flow of activities requires strong team leadership (see Chapter 2).

Figure 6.5 illustrates the many phases, both quantitative and qualitative, that go into developing and testing measures, implementing the program, and conducting follow-up. In this figure, the evaluation process contains multiple core designs, and these designs link different phases of the project. The first core design is an exploratory sequential design and the second an explanatory sequential design.

FIGURE 6.5
Embedding Core Designs in Evaluation Studies



CHOOSING A COMPLEX DESIGN

The first step in the process requires determining if you have a core design or a complex design. Criteria of these designs by Nastasi and Hitchcock (2016) are worth noting: The project should have multiple phases, cover multiple years, have large funding, and involve multiple researchers. Then the project requires choosing which type of complex design to use. Start by considering which process or framework best addresses the research problems and questions in your study. It also requires understanding the basic steps or procedures involved in the process or framework selected. These can be drawn from the readings recommended below. Consideration needs to be given to the types of mixed methods studies published in a field or discipline and advisers or mentors and their familiarity with the process or framework. Choosing the appropriate core designs would follow the advice that I provided in Chapter 5.

RECOMMENDATIONS FROM THIS CHAPTER

This chapter addresses the complex designs used in mixed methods research. Researchers embed one or more of the core designs into a process or framework. Often these designs are conducted by multiple team members over a sustained period of time with adequate resources. Also, the use of a complex design indicates that mixed methods is more than a stand-alone design; it has value in linking to many other methods (e.g., experiments), methodologies (e.g., evaluations), and theories (e.g., social inequality or participatory action research). In this chapter, I reviewed four types of complex designs: an experiment or intervention design in which the qualitative data were embedded at three possible time points in the design, a participatory action research design in which the core designs were embedded within the stages of conducting a participatory project, a multiple case study design with the quantitative and qualitative data collection helping to form the cases or to document the cases, and an evaluation design with the mixed methods core designs embedded within one or more of the steps in the evaluation process. Choosing which complex design to use requires selecting an approach that best answers the research question or problem. It also requires understanding the process or framework within which the embedded core designs are placed.

ADDITIONAL READINGS

For general research designs, see the following:

Creswell, J. W., & Gutterman, T. (2018). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.) Boston, MA: Pearson.

For experimental or intervention designs, see the following:

Bradt, J., Potvin, N., Kesslick, A., Shim, M., Radl, D., Schriver, E., Gracely, E. J., & Komarnicky-Kocher, L. T. (2014). The impact of music therapy versus music medicine on psychological outcomes and pain in cancer patients: A mixed methods study. *Support Care Cancer.* Advance online publication. DOI: 10.1007/s00520-014-2478-7

O'Cathain, A. (2018). *A practical guide to using qualitative research with randomized controlled trials*. Oxford, UK: Oxford University Press.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

For participatory action research design, see the following:

Ivankova, N. V. (2015). *Mixed methods applications in action research: From methods to community action*. Thousand Oaks, CA: SAGE.

For case studies designs, see the following:

Shaw, E. K., Ohman-Strickland, P. A., Piasecki, A., Hudson, S. V., Ferrante, J. M., McDaniel, R. R., Jr., . . . Crabtree, B. F. (2013). Effects of facilitated team meetings and learning collaboratives on colorectal cancer screening rates in primary care practices: A cluster randomized trial. *Annals of Family Medicine, 11*(3), 220–228.

Stake, R. (2006). *Multiple case study analysis.* New York, NY: Guilford.

For evaluation designs, see the following:

Nastasi, B. K., & Hitchcock, J. (2016). *Mixed methods research and culture-specific interventions: Program design and evaluation.* Thousand Oaks, CA: SAGE.

Nastasi, B. K., Hitchcock, J., Sarkar, S., Burkholder, G., Varjas, K., & Jayasena, A. (2007). Mixed methods in intervention research: Theory to adaptation. *Journal of Mixed Methods Research, 1*(2), 164–182. DOI: 10.1177/1558689806298181

Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2004). *Evaluation: A systematic approach*. Thousand Oaks, CA: SAGE.

Drawing Diagrams of Designs

7

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How does a researcher use diagrams of a design?
- What tools are available for drawing diagrams?
- What are several essential elements to go into a diagram?
- What are some steps in drawing core and complex designs?
- What other elements can be added to diagrams?

USING DIAGRAMS

A **diagram** is figure of method procedures of a mixed methods design. As mentioned in Chapter 5, my approach is to focus on the methods in design, and therefore the diagram will reflect primarily the methods of data collection, analysis, and interpretation or metainferences. It may be unusual to think about having a procedural diagram in a study, but we do have visual presentations in studies for the theories and for sampling procedures. When our procedures are complex—such as in mixed methods, where there are multiple quantitative and qualitative data collection and analysis steps—it is helpful to have a visual diagram to pull together all of the components of the study. Added to this is that mixed methods might be hard to understand because it is new, and an overview of the procedures can be useful to stakeholders for a project and for readers.

Around 2003, a call with a federal funding program officer led to the development of diagrams for mixed methods procedures. This officer liked mixed methods studies but said that they were difficult to understand because of the multiple types of data collection and analysis. After that conversation, my colleagues and I began developing diagrams of our mixed methods procedures,

and we have continued to elaborate and draw them ever since. They have multiple uses. For readers, diagrams simplify complex processes of data collection and analysis. Graduate students can begin with their diagram as they launch into a discussion about their proposed mixed methods study. Diagrams provide a nice overview of the detailed procedures. These diagrams frequently appear in issues of journals, such as the *Journal of Mixed Methods Research.* They are also being included in applications or proposals for funding, and they become helpful visuals during presentations of mixed methods studies at conferences. They can also help plan a study and convey to stakeholders and team members the basic procedures being used in a project. In short, diagrams have multiple uses, and they indicate to readers an understanding of the research methods procedures.

USING TOOLS FOR DRAWING DIAGRAMS

To draw a diagram, I would recommend using a computer program—if the figure is to be published or presented to an audience. Many mixed methods researchers use PowerPoint to draw a figure because of the ease of placing material on a slide. Others might use a word processing program or even compose a figure using a spreadsheet program. Of course, there are also specific computer drawing programs that might be used. Recognize that diagrams go through many iterations before you see them published in journal articles, conference papers, or dissertations/theses. Thus, computer tools are essential for developing drafts of the diagrams.

IDENTIFYING ESSENTIAL ELEMENTS TO PLACE IN DIAGRAMS

Diagrams certainly differ in their form and structure. They may be represented in circles, horizontal layouts, or vertical figures. Drawing a diagram represents a creative step in the process of mixed methods research. Still, it is helpful to pay attention to some essential elements that we see in most diagrams. In 2006, Ivankova, Creswell, and Stick assembled key ideas that guide what goes into a diagram. I have modified slightly their five elements. They include the following:

1. Boxes that show the data collection and analysis for both quantitative and qualitative research
2. A circle that shows the interpretation or the inference phase of the project
3. Procedures that attach to both the data collection and analysis phases of both quantitative and qualitative research. These are shown as bulleted points positioned alongside the boxes.

4. Products or outcomes that will result from each phase of data collection, analysis, and interpretation or inferences (represented by bullets positioned alongside the boxes)
5. Arrows that show the sequence of procedures

An elaboration on these elements and others follows.

Title

The diagram or figure needs to have a title that conveys the type of design being used. For example, the title might be stated as follows:

> Example 1. A title for a diagram using a convergent mixed methods design
>
> Figure X. A Convergent Design of the Mixed Methods Study of Adolescent Smoking Behavior

This title mentions the type of design as well as the key intent or focus of the study. In a short title, there is no need to mention the participants or the site (although the participants may be implied from the wording of the title, as shown in Example 1).

Vertical, Horizontal, and a Circle Form Drawings

The diagram can be drawn vertically, horizontally, or in a circle on the page. Typically, the convergent design is drawn vertically, and sequential designs are drawn horizontally. Writers need to consider their audience for these diagrams to determine what would be most appropriate. For example, most diagrams drawn for studies in the military or in the health sciences are drawn vertically to match the often top-down structure found in these organizations. Circles are creative drawings not frequently used, but in using them, researchers need to be careful so that the diagram does not become overly complex and difficult to interpret.

Simplicity

Another consideration is whether to label the information in the boxes as "Data collection" or "Data analysis" or to include a more complete description, such as "Interview data collection" or "Interview data collection with 20 adolescents." Individuals new to mixed methods often include more complete information and detail in the boxes in a diagram than is needed. These individuals may have more of a "content" orientation to the drawing than a "methods" orientation, and they develop the diagram to tell as much about the content of the study as the specific methods procedures.

A key idea in drawing a diagram is not to overdraw it but to keep it simple and straightforward. Thus, many different arrows going many directions would not be recommended, and the simple configuration of single arrows for data collection, data analysis, and interpretation for both the quantitative and qualitative strand would be advised.

Single Page

The diagram needs to fit on a single page. This approach conserves space as well as facilitates reading the diagram. Having to follow arrows or boxes from one page to another is often confusing.

Timeline

It is helpful to assign times to different phases of the research. When will data collection occur? Data analysis? Interpretation? The timeline in months or days can be placed on a line that runs alongside the boxes in the diagram. It helps readers as well as the researcher understand when the phases of the project will occur.

Study Aims or Research Questions

Assuming that the researcher identifies phases in a project by labeling the boxes when the phases begin, another diagram features the study aims or research questions. These components are positioned directly above the phases where they occur. In this way, quantitative aims or questions, qualitative aims or questions, and mixed methods questions can be placed alongside the phases of the study in the diagram.

DRAWING DIAGRAMS IN STEPS

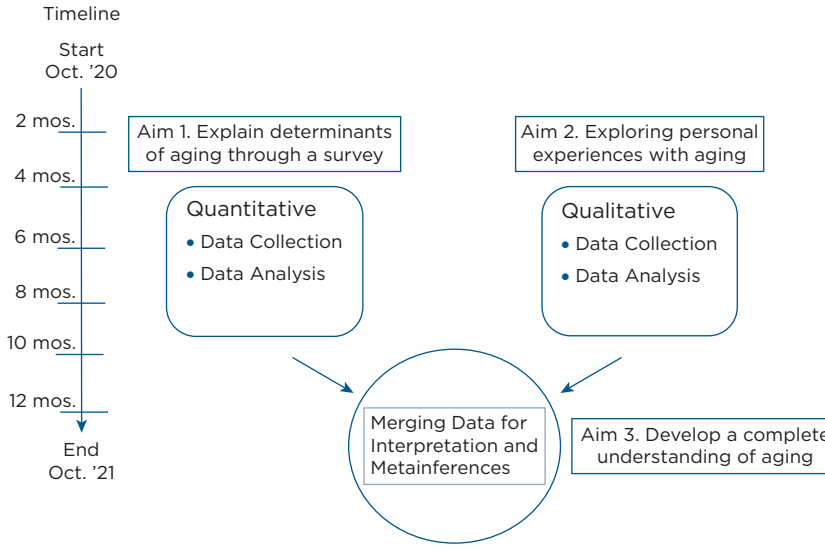
I presented the steps for drawing diagrams of core designs at a workshop for the Mixed Methods International Research Association (MMIRA) conference in Durham, England, in 2016 (Creswell, 2016). Since then, I have been modifying and improving how I present information to help researchers draw a diagram of their design. I have added many of the essential elements that I have discussed in this chapter.

In Figure 7.1, I show a completed diagram for a convergent mixed methods design on the hypothetical topic of understanding aging among senior citizens. I present a PowerPoint slide that unfolds the several parts of this diagram.

1. I first have researchers draw two boxes for quantitative and qualitative data. I describe how diagrams begin with simply the two boxes for the data, and I mention that in the boxes, the researchers should put

FIGURE 7.1

Explaining Aging: A Convergent Mixed Methods Design



bullets for data collection and data analysis. I encourage researchers to be as specific as possible about the type of data collected, the sample, the instrument or protocol, and the statistics or coding/themes and the software to be used. See Table 7.1 later in this chapter that details these elements.

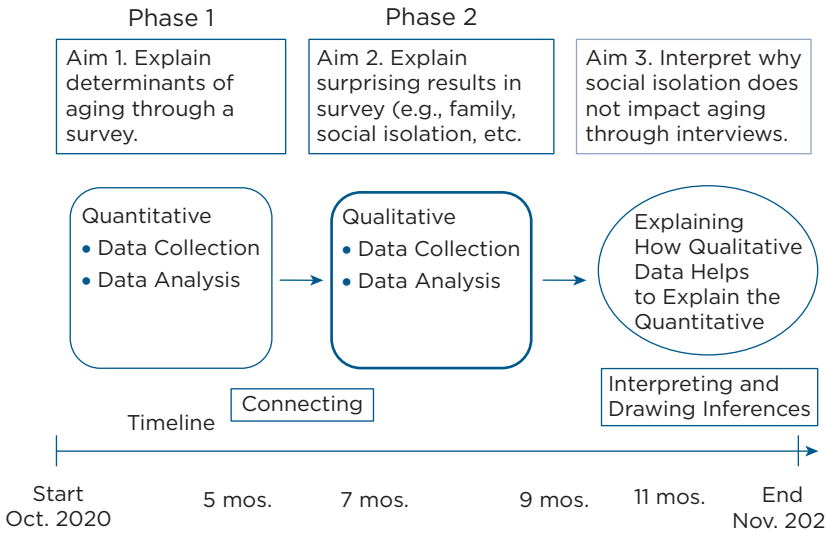
2. I then have the researchers develop a circle for the integration or the merging of the data and their interpretation and inferences. Circles are not essential for this phase of the project, but they do differentiate the interpretation and the inferences clearly from the data collection and analysis. When researchers have a decision point in their procedures, I recommend drawing this point as a circle.
3. Next, they draw arrows to show the sequence of the procedure from the data collection and analysis to the interpretation and merging of the data. In this example, the arrows show the flow from the top down.
4. Next, I have them add aim (or research questions) for their quantitative aim, their qualitative aim, and their mixed methods aim and array them above or next to the major boxes for quantitative,

qualitative, and mixed methods research. In the example, I provide a hypothetical study on aging, as well as the quantitative determinants, the qualitative exploring, and the complete understanding that develop through interpretation and inferences.

5. Then I have them provide a title for the diagram, including the topic and the type of mixed methods design. This becomes the figure heading for their diagram.
6. Finally, I have them draw a timeline for their study in a horizontal line and show when each step in the process will be completed. This timeline is especially useful for graduate students' research projects and for proposals or applications for funding, and it gives readers a sense that the study will be completed (and on time).

FIGURE 7.2

Explaining Determinants of Aging: An Explanatory Sequential Mixed Methods Design



In my presentation on drawing diagrams, I then show researchers the development of a sequential core design, using an explanatory sequential design as an example. I could add an exploratory sequential design diagram as well, but it is sufficient to show a convergent design and one sequential design. As shown in Figure 7.2, I unfold the steps in a similar way to the steps for the convergent design:

1. I first have researchers draw two boxes for quantitative and qualitative data. Again, researchers need to be as specific as possible about the type of data collected, the sample, the instrument or protocol, and the statistics or coding/themes and the software to be used. In the case of the explanatory sequential design, the first box on the left is quantitative data collection and analysis, and the second box on the right would be qualitative data collection and analysis.
2. Next, I ask the researchers to draw arrows from the quantitative box to the qualitative box. This shows the sequence of moving from the first quantitative phase to the second qualitative phase.
3. I then have the researchers develop an interpretation or metainference circle for explaining the quantitative results with the qualitative data. Arrows are again inserted from the qualitative data collection to the interpretation to show the flow of the study.
4. Next, I have them add aims (or research questions) for their quantitative aim, their qualitative aim, and their mixed methods aim and array them above or next to the major boxes for quantitative, qualitative, and mixed methods research. Again, I use a hypothetical example to illustrate the three aims.
5. Then I have them provide a title for the diagram, including the topic and the type of mixed methods design. This becomes the label for their diagram.
6. Finally, I have them draw a timeline for their study in a vertical line and show when each step in the process will be completed.

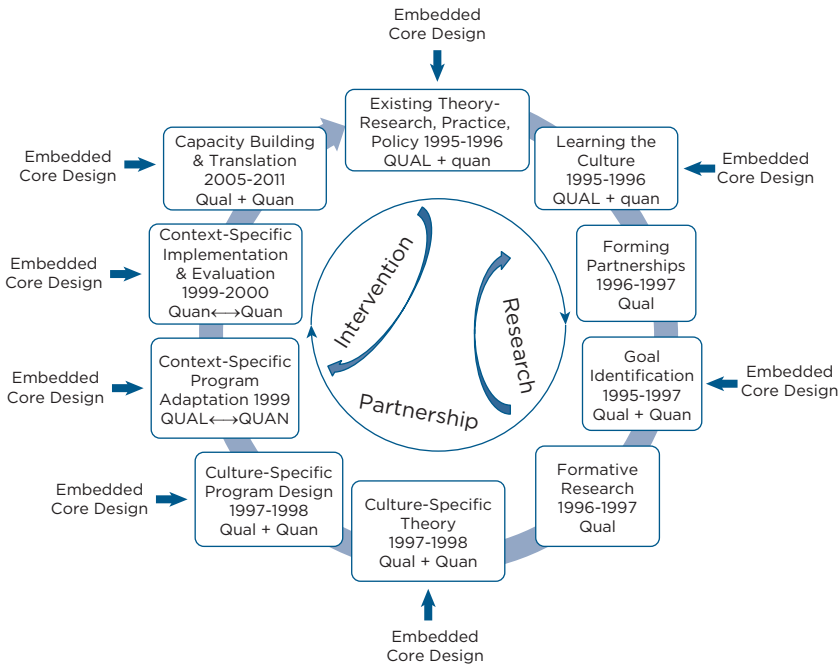
After taking the researchers in my workshops through the two core designs, I then turn to the complex designs. As I mentioned in Chapter 6, it is important to start drawing this diagram by providing steps in the process of research that they will engage in such as the phases in an experiment, the outreach activities of a participatory design, the formation of cases in a case study design, or phases of an evaluation of a program. As I also mentioned earlier, drawing a complex design requires knowing the framework or the process and their various steps in this process.

In Figure 7.3, I show a diagram modified from Nastasi and Hitchcock (2016) of a complex mixed methods design for an evaluation project. The authors conducted a multiyear program evaluation of a program for youth in Sri Lanka. In their rectangular-shaped boxes in Figure 7.3, we see the steps in their evaluation process (e.g., existing theory, learning the culture, forming partnerships, etc.). Also shown in this figure, we see the types of data collected at each step. In most steps, they collected both quantitative and qualitative data, and these steps represented opportunities for multiple core mixed methods designs. They frequently

used convergent designs indicated by the "plus" sign between the quantitative and qualitative data (except for two phases—adaptation and implementation—where they had directional arrows). Thus, to draw this complex design for an evaluation of a program, I would recommend presenting two diagrams. The first would be a diagram of the evaluation as shown in Figure 7.3, which indicates the steps in the program evaluation process. The second would be a diagram of the core designs used in the evaluation. If drawing two diagrams presents too much information for limited page lengths (such as in journal articles or applications for funding), then the second diagram could be simply discussed rather than presented as a figure.

FIGURE 7.3

Embedded Core Designs in an Evaluation Study



Source: Adapted from Nastasi & Hitchcock (2016).

The steps for drawing a complex design (as I indicated in Chapter 6) then become the following:

1. Identify the complex process or framework. This framework may be the phases in an experiment, the process followed in an evaluation, and so forth.

2. Draw the steps in this process or framework. I typically draw these in a circle with arrows to show the direction of the process. A circle is used in Figure 7.3 in the Nastasi and Hitchcock (2016) study. In the example shown of the complex mixed methods participatory action process as shown in Figure 6.3 (Ivankova, 2015), a circle with steps was shown.
3. Indicate at each step the type of data to be collected (i.e., quantitative, qualitative, or both). In Figure 7.3, quantitative is abbreviated as *quan,* and qualitative is abbreviated as *qual*.
4. At those steps where you have an opportunity to collect both quantitative and qualitative data, indicate that a core design will be used to integrate the data. In the original Figure 7.3 in the Nastasi and Hitchcock (2016) study, the type of core designs is not mentioned, but they could have been identified by name.
5. For the core design (or designs), draw a second diagram of the core design used in the study or discuss the core designs in the written mixed methods report.

DETAILING THE DIAGRAMS

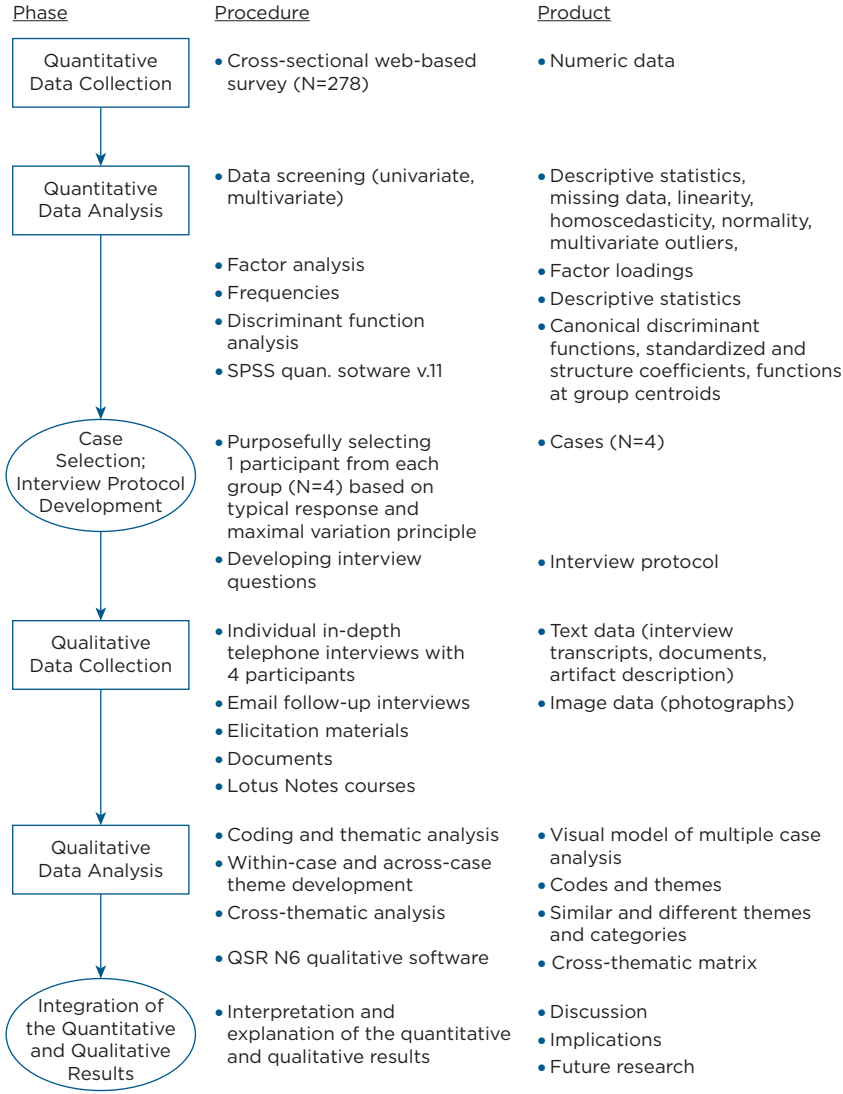
Earlier in Chapters 5 and 6, I showed a rudimentary drawing for the three core designs—convergent, explanatory sequential, and exploratory sequential—and for four complex designs—experimental, participatory action research, multiple case study, and evaluation designs. Now I would like to add more detail into these designs and suggest how this might be done. I will include in these designs the elements already discussed, such as the phases, the timeline, and the study aims or questions.

It is helpful to see a well-detailed diagram of a mixed methods design that can be used as a template by others for their designs. I have often showed the diagram of an explanatory sequential design by Ivankova and Stick (2007) as an exemplar model. I have reproduced this diagram, as shown in Figure 7.4. The diagram illustrates the columns of the phase of the research, followed by the procedures and finally the products. In the boxes, we see detailed information at each step in the research process, which flows from a quantitative initial phase to the selection of cases and then the final qualitative phase. This diagram does not show all of the elements I have mentioned in Table 7.1, but it does provide a detailed understanding of the design and the study.

I will add details about this diagram by Ivankova and Stick (2006), namely, to include specific information about procedures used in each step in the process as well as outcomes or products expected at each step. Table 7.1 illustrates the types of data that could be provided in the diagram for both quantitative and qualitative data collection and analysis. These elements could be shown in

FIGURE 7.4

A Detailed Example of a Diagram for an Explanatory Sequential Design (Ivankova, Creswell, & Stick, 2006)



Source: Ivankova, Creswell & Stick, 2006.

a diagram in boxes with bullets for each of the procedures and products or outcomes. *Procedures* refer to the steps or methods the researcher undertakes during each phase of the study, while *products or outcomes* indicate specific results at each

TABLE 7.1

Information for Procedures and Products/Outcomes in a Diagram

	Procedures	Products or Outcomes
Quantitative data collection	Participants Sample size (*N*) Data collection instruments Variables	Database with items/ variables/scales
Quantitative data analysis	Clean database Input into software program Descriptive results Inferential results	Statistical results in tables Significant results, effect sizes, confidence intervals
Qualitative data collection	Participants Sample size (*N*) Data collection protocols Central phenomena	Text database
Qualitative data analysis	Transcribing data Coding Themes	List of quotes, codes, and theme Possible diagram linking themes

stage. Products or outcomes are especially helpful to have in making reports to federal, state, and public agencies about the specific results of a project.

RECOMMENDATIONS FROM THIS CHAPTER

In conclusion, I would recommend that a diagram of procedures always be included with a mixed methods study. This diagram provides a useful overview of the procedures and helps readers understand complex features of the design. A computer program can assist in the drawing of these diagrams, but I typically use a PowerPoint slide because it is easy to change the features of the diagram. Often multiple iterations are needed for the diagram before the final copy emerges. There is no set way to draw the diagrams, but certainly they need to be simple and straightforward without many directional arrows. They also typically consist of boxes, circles, procedures, and products or outcomes as major elements of the study. All of this needs

to be presented in a single page. In this chapter, I have conveyed the procedure I use to draw diagrams for core and complex designs with illustrations of the detail that can go into the diagrams. Further, details about the procedures and the products/outcomes in bulleted fashion add useful information about the design.

ADDITIONAL READINGS

I will include in these additional readings my favorite diagrams published in journal articles:

For a convergent mixed methods design, see the following:

von der Lippe, H. (2010). Motivation and selection processes in a biographical transition: A psychological mixed methods study on the transition into fatherhood. *Journal of Mixed Methods Research, 4*(3), 199–221.

For an explanatory sequential mixed methods design, see the following:

Ivankova, N. V., Creswell, J. W., & Stick, S. (2006). Using mixed methods sequential explanatory design: From theory to practice. *Field Methods, 18,* 3–20.

For an exploratory sequential design, see the following:

Huang, H. (2014). The influence of the ecological contexts of teacher education on South Korean teacher educators' professional development. *Teaching and Teacher Education, 43,* 1–14.

For an experimental design, see the following:

Plano Clark, V. L., Schumacher, K., West, C., Edington, J., Dunn, L. B., Harzstartk, A., & Miaskowski, C. (2013). Practices for embedding an interpretive qualitative approach within a randomized clinical trial. *Journal of Mixed Methods Research, 7*(3), 219–243.

For a participatory design, see the following:

Ivankova, N. V. (2015). *Mixed methods applications in action research.* Los Angeles, CA: SAGE.

For a "circle" diagram in a multiple case study design, see the following:

Bustamante, C. (2017). TRACK and teachers of Spanish: Development of a theory-based joint display in a mixed methods research case study. *Journal of Mixed Methods Research, 13*(2), 163–178.

For an evaluation design, see the following:

Nastasi, B. K., Hitchcock, J., Sarkar, S., Burkholder, G., Varjas, K., & Jayasena, A. (2007). Mixed methods in intervention research: Theory to adaptation. *Journal of Mixed Methods Research, 1*(2), 164–182.

Sampling, Integration, and Metainferences

8

QUESTIONS ADDRESSED IN THIS CHAPTER:

- How does a researcher conduct qualitative and quantitative sampling in a mixed methods study?
- How does sampling differ among the types of mixed methods designs?
- What is the intent and procedure for conducting integration in the mixed methods designs?
- How can integration be represented and analyzed through joint displays?
- What is the intent and procedure for drawing metainferences from the integration analysis?

EXPLORING SAMPLING, INTEGRATION, AND METAINFERENCES

In Chapters 5 and 6, I introduced some of the challenges that need to be anticipated when conducting the three core designs and the four complex designs. These challenges, which I have referred to as "methodological issues" or "validity issues" in conducting mixed methods research, sometimes relate to how researchers bridge from one data set to another, incorporate a lens or framework into a study, or develop an instrument for measurement that has good psychometric properties. A close inspection of these challenges, however, shows that the major issues confronting the mixed methods researcher relate to three issues in the procedures: sampling, integration, and metainferences. **Sampling in mixed methods research** refers to three sampling procedures: (1) selecting participants

(and sites) in quantitative research, (2) selecting participants (and sites) in qualitative research, and (3) combining or connecting the samples within a mixed methods design. These sampling issues relate to who, how many, and how the samples will be used within specific mixed methods designs (i.e., core and complex designs). **Integration**, on the other hand, refers to the type of connection being made between the qualitative and quantitative data in a particular design. Often, I call this integration as the point in procedures where the quantitative and qualitative data bump up against each other, similar to the way that bumper cars touch in a carnival ride. There are many different ways that these databases relate to each other, and I will review the types in this chapter. **Metainferences,** as the third topic in this chapter, refers to the inferences, insight, or conclusions researchers draw from the results of the integration of the databases. This procedure in mixed methods is called metainferences because it represents inferences beyond those collected in the qualitative and quantitative strands in a study. In a mixed methods study, the researcher first draws inferences from both the qualitative and quantitative data and then advances metainferences from the integration of the two databases. These three procedural topics—sampling, integration and metainferences—become the focus of this chapter.

CONDUCTING SAMPLING IN MIXED METHODS STUDIES

I will first begin with qualitative sampling, quantitative sampling, and then mixed methods sampling. Unquestionably, researchers use different procedures for quantitative and qualitative sampling, although there are basic topics common to both approaches. Researchers attend to sample size, types of participants in the sample, and open-ended questions through interviews or closed-ended questions through instruments. Mixed methods sampling varies by type of design, and it deserve separate discussion apart from the quantitative and qualitative approaches. It, too, involves a consideration of sample size, the participants, the types of questions to ask, and the protocols (guides) or instruments used to collect data. In addition, rigorous procedures need to be used for all of these phases of sampling, and researchers should not minimize the quantitative and qualitative sampling because of the rigor and extent of collecting and analyzing both forms of data.

Qualitative Sampling

Qualitative research sampling is **purposeful (or intentional) sampling** through the selection of a sample of participants who can best help the researcher understand the central phenomenon being explored. This is far from an "anything goes" type of sampling. A number of purposeful sampling strategies exist, such as maximal variation sampling, in which individuals who differ are selected so that diverse perspectives—a goal of good qualitative research—are

built into the design, or critical sampling, in which specific individual cases or criteria are used to select individuals to further learn about how they are experiencing the phenomenon. Additional forms of purposeful sampling exist both before the study begins and after the study has commenced (e.g., criterion sampling, snowball sampling, confirming/disconfirming sampling) (see Creswell & Gutterman, 2018). Individual participants in a qualitative study need to be recruited for participation, and permissions should to be granted often at several levels (e.g., institutional review board [IRB] approval, site approval, individual participant approval).

Sample size in qualitative research has been a topic of debate for many years. The traditional stance on size is to consider it as a function of when **saturation** occurs in a study. Saturation can be defined as the point in data collection when the researcher gathers data from several participants and the additional collection of *new* data would not add substantially to the existing codes or themes. At this point of saturation, the researcher ceases collecting data. This point is a subjective assessment on the part of the researcher, but the qualitative report can document when the researcher reached saturation. Another method of determining sample size in qualitative research—and this is one I also endorse—is to examine a number of published qualitative studies by design (e.g., narrative research, phenomenology, grounded theory, ethnography, case study research) and to base the qualitative sample size on examples of ranges of numbers found in the literature. Using this method of examining published journal articles, we have recommended using one or two individuals for a narrative study, 3 to 10 participants for a phenomenology, 20 to 30 individuals for a grounded theory study, a single culture-sharing group for ethnography, and four to five cases for case study research (Creswell & Poth, 2018). For each of these numbers, specific published studies can be cited to back them up. Thus, in qualitative sampling, the sample size will be smaller than for quantitative research, but the intent of the two sampling procedures differs. In qualitative sampling, purposefully select participants who can best help understand the central phenomenon being explored.

Quantitative Sampling

In quantitative sampling, the intent is to sample individuals who are representative of a specific population. Recruiting individuals to the sample needs to be done carefully so that the right participants enter the study. Permissions then need to be obtained from these individuals, following IRB procedures. Permissions may also be needed from key personnel at the research sites being studied (e.g., administrators at the hospital, principals at the school). Attention also needs to be given to selecting the appropriate sampling strategy. A good sampling strategy is **random sampling,** in which a sample is selected randomly from a population so that generalizations can be made to the population. Sampling may fall into the category of probability sampling, such as in simple random sampling,

stratified sampling, or multistage cluster sampling. However, this approach in some studies may not be available, given the need to sample individuals who are available or who volunteer. This leads to nonrandom sampling or nonprobability sampling. For example, participants might volunteer to be included in a study or be recommended by others, as in convenience or snowball sampling (Creswell & Gutterman, 2018).

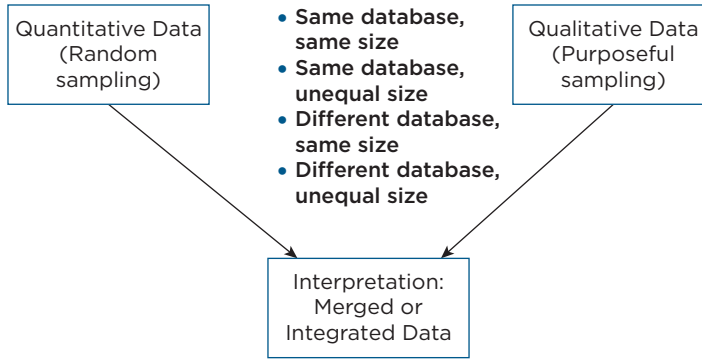
Sample size is another consideration. It is important to select as large a sample as possible, because with a large sample, there is less room for error in how well the sample reflects the characteristics of the population. Fortunately, in both survey research and experimental research, there are aids to help select an appropriate sample size. In survey research, I would suggest using a sampling error formula discussed in a book such as *Survey Research Methods* (Fowler, 2008). A table in this book indicates the appropriate calculation for determining sample size based on the chance (proportion) that the sample will be evenly divided on a question, its sampling error, and its confidence interval. To estimate sample size for an experiment, a different formula takes into consideration the level of statistical significance (alpha), the amount of power desired in a study (e.g., 0.80, 0.90, 0.95), and the effect size (the practical difference you are willing to live with) (Lipsey, 1990). From this formula, a researcher can determine an appropriate size for the groups in an experiment.

Mixed Methods Sampling

Mixed methods research involves both the qualitative and the quantitative sampling procedures. Additionally, mixed methods sampling involves further steps. To integrate the qualitative and quantitative data requires sampling that fits the particular mixed methods design in a study. We need to look closely at each type of mixed methods design to identify the appropriate sampling strategy to use.

In a *convergent design*, as shown in Figure 8.1, sampling needs to proceed so that the two databases can be compared or merged. Who should be sampled for the qualitative database and for the quantitative database? This is a question that individual researchers must answer about their studies, and several options exist. In terms of approach, as already mentioned, the quantitative sample proceeds from a random or nonrandom sampling procedure, while the qualitative sample proceeds from purposeful or intentional sampling. Should the participants come from the same population? I feel that participants should ideally come from the same population. In some cases, mixed methods researchers use a different unit of analysis for each sample (e.g., hospital administrators for the quantitative sample and health providers for the qualitative sample). Having different units of analysis should work especially well when the intent of the convergent design is to compare different perspectives. If the intent is to validate one database with the other, then I would recommend using the same individuals for both the qualitative and quantitative samples.

FIGURE 8.1
Sampling in a Convergent Design



Should both samples be of equal size? One option is to have the same sample size for both the quantitative and qualitative data collection. With the quantitative database being quite large, selecting a qualitative database of equal size leads to extensive qualitative data collection and data analysis, as well as requires resources and time. However, equal sizes can be used, especially when the quantitative sample is small.

Another option is to weigh the qualitative data so that the cases are equivalent to the quantitative cases. This technique entails adopting a quantitative strategy toward the data and raises the further complication of deciding a good weighting formula. A final approach is to accept the differences in the intent of sampling between the qualitative and the quantitative samples (purposeful vs. random) and accept that the two sampling strategies result from different reasons. Given these differences, qualitative or quantitative researchers might well argue that equal size is unnecessary because the intent of collecting the data differs. Thus, the large quantitative database and the smaller qualitative database can be compared regardless of their respective sizes. When this stance is taken, the researcher discussing the sampling procedure needs to remind the reader of the different intents of the two databases.

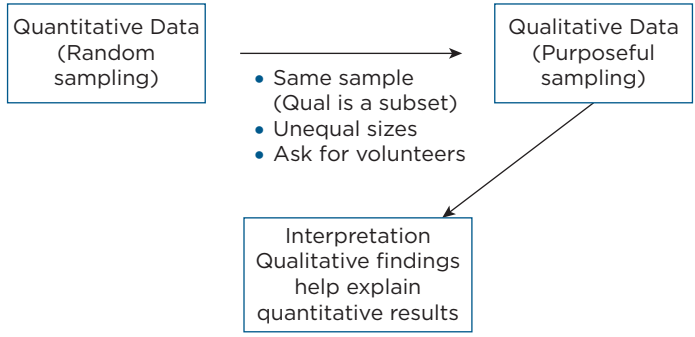
When a researcher transforms the qualitative results into quantitative scores—a convergent transformation design—the need to make decisions about sample size would not differ from what I have said. As for unit of analysis, I feel that the units of analysis for both the quantitative and qualitative databases should be the same because the transformed qualitative data will be combined with the quantitative data. Usually, the transformed data become one or more new variables to be added and analyzed within the quantitative database.

Finally, in a convergent design, the results may not match when the researcher makes a comparison: A discrepancy exists between the two databases on specific research questions. When this happens, the researcher needs to engage in follow-up steps. Several options exist for this follow-up. The researcher may go back and reexamine the results from both databases to help explain the discrepancy and engage in a reanalysis of the databases. Another option is to collect more data, which may be feasible if time and resources are available. In this case, a sampling strategy would be enacted that collects both additional quantitative and qualitative data. With limited resources, these samples may be small, yet they would provide valuable information to inform the discrepancy. Finally, the results from one database may be trusted more than the results of the other database. Perhaps the qualitative data collection questions did not probe deeply enough or the quantitative measures did not yield high reliability or validity scores.

In an *explanatory sequential design,* the random sampling proceeds on the initial quantitative strand and the follow-up purposeful sampling on the qualitative strand. As shown in Figure 8.2, two factors need to be considered in sampling in an explanatory sequential design: qualitative sample selection and the identification of questions to ask the qualitative sample.

FIGURE 8.2

Sampling in an Explanatory Sequential Design



How is the initial quantitative sample selected? Ideally, the researcher would collect a random sample. From a close inspection of the results, the researcher then needs to identify what quantitative results need further explanations. Therefore, in the follow-up phase, the researcher samples a *subset* of the quantitative sample, and because qualitative data collection consists of obtaining information from fewer participants than the quantitative sample, the sizes of the two

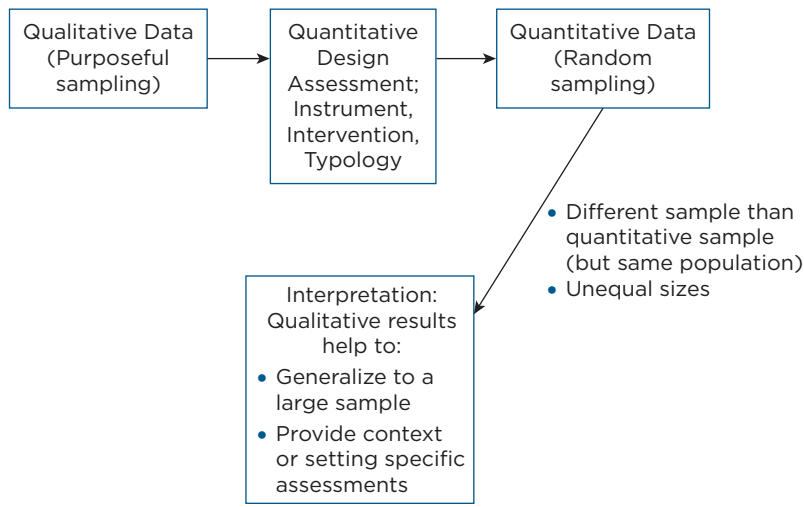
samples will likely be unequal. These participants can be individuals from groups stratified in the quantitative sample, or they can be volunteers (who are invited on the quantitative instrument to participate in the qualitative phase).

What questions need to be asked of these qualitative follow-up participants? The questions (e.g., in a focus group) would ask for detailed explanations about the quantitative results. Possible questions could address significant relationships that emerge between or among variables, nonsignificant relationships, unusual outlier results, or expected or surprising results. Participants need to be selected from the initial quantitative sample (i.e., a subset) who can help understand these questions. They can be asked directly about the topics that need further clarification and understanding through interviews or during observations.

In an *exploratory sequential design,* the sampling procedure is somewhat more complex. The approach to sampling is opposite the one taken in the explanatory sequential design. As shown in Figure 8.3, the sample for the quantitative follow-up may be different in several respects: size, composition, and questions.

FIGURE 8.3

Sampling in an Exploratory Sequential Design



In this design, the size of the sample from the initial qualitative strand of the study will be smaller than the quantitative sample because of purposeful versus random sampling. Also, this size difference means that the quantitative sample will be composed of different participants than the qualitative sample.

This distinguishes the exploratory sequential design from the explanatory sequential design (in the initial phase of the research). As for what constitutes adequate qualitative sample size, I feel that size will differ depending on the type of quantitative assessment needed (e.g., more participants to modify a survey instrument, less participants to plan experimental activities). I do feel that it is helpful to choose both samples from the same population but to exclude the qualitative sample participants from the quantitative sample participants. I would not advise using different populations for the two sampling procedures, and I would discourage drawing the samples from different units of analysis (e.g., one from hospital providers and one from hospital patients). Finally, the open-ended questions in the initial qualitative phase will change to closed-ended questions in the quantitative phase when the researcher makes a quantitative assessment. The sampling for the quantitative follow-up phase needs to be of adequate sample size for statistical analysis.

For *complex mixed methods designs,* recall that the core designs (one or more) are embedded within a framework or process (e.g., experiment/intervention, an evaluation process, the steps in a participatory action research study). The sampling in the core designs would follow my recommendations for the convergent design, the explanatory sequential design, and the exploratory sequential design. However, as these core designs enter the frameworks or processes, additional sampling strategies may be put in place. Figure 8.4 presents these sampling considerations for embedding core designs in the complex design of an experiment. Figure 8.5 illustrates the sampling approach that can be taken in the complex design of a mixed methods multiple case study design.

FIGURE 8.4

Sampling Within a Mixed Methods Experimental Design

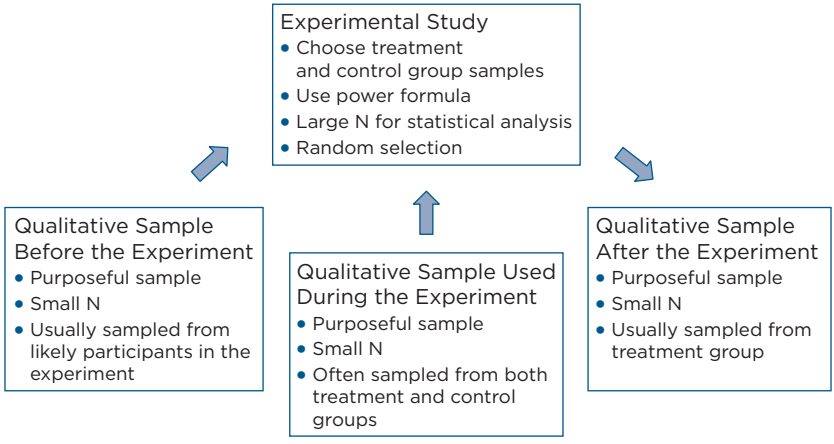
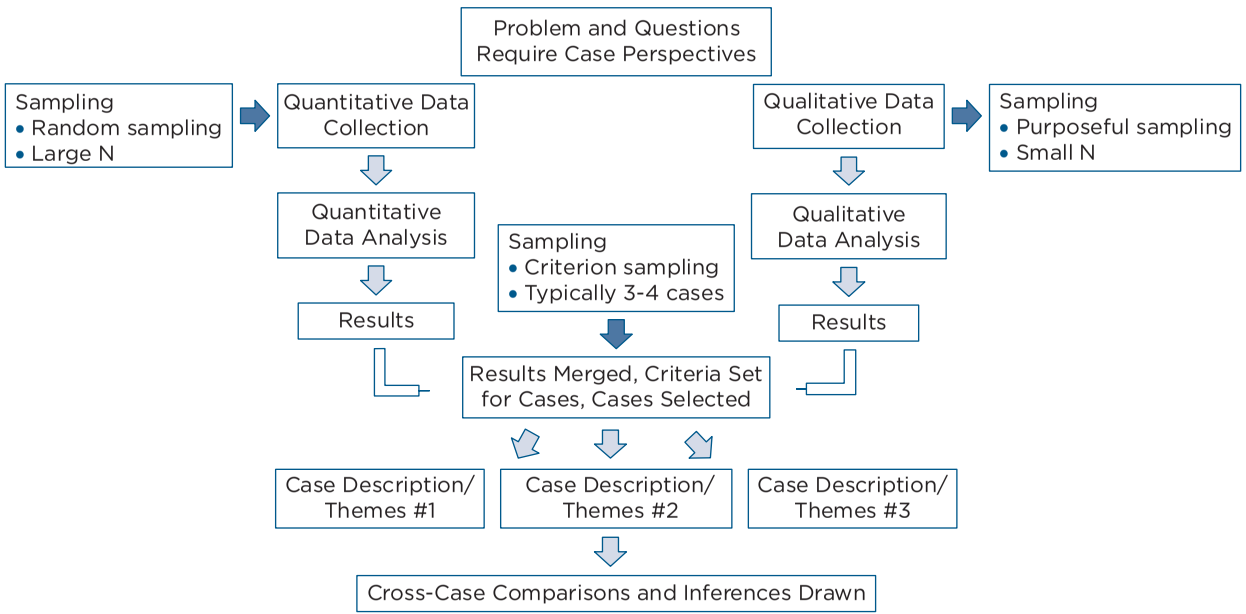


FIGURE 8.5

Sampling Within a Mixed Methods Multiple Case Study



As shown in Figure 8.4, we still see both purposeful sampling in the qualitative components brought into the experiment and quantitative sampling (i.e., random assignment) in the experimental part of the study. It is the qualitative sampling in this design that needs to be given some thought. If qualitative data are collected prior to the experiment, then the intent must be made clear, and it needs to be a large enough sample most useful for the experiment. For example, if the intent is to gather qualitative data *before* the experiment in order to best recruit participants to the experiment, sampling needs to intentionally focus on the participants sought for the experiment, and the questions should be phrased to contribute to this intent. A large sample is not needed, and it probably should be participants who will likely be involved in the experiment. If qualitative data are collected *during* the experiment, the sample is best when it includes individuals in both the control group and the experimental group. Often in experimental designs, mixed methods researchers collect qualitative data from the experimental group only, probably because of limited resources and because they want to learn how the experimental group experiences the treatment. If qualitative data are collected *after* the experiment to follow up on the outcome results, normally the sample is selected from the experimental group because it is that group that received the experimental treatment, and the researcher wants to know why that group changed or did not change after the treatment. Selecting from one group, such as the experimental group, also saves resources and time.

As shown in Figure 8.5, in a complex mixed methods multiple case study with an embedded convergent core design, sampling in the initial stages of this design involves using good procedures for both quantitative and qualitative sampling. However, after the results are merged, the researcher has the additional sampling decision as to what cases to choose to analyze further and compare. I would suggest criterion-based sampling for this step. This means that the researcher identifies specific criterion for selecting cases for further analysis and comparisons. The criteria might be to select cases that substantially differ in terms of the merged qualitative and quantitative results, or it might be extreme cases or cases that are similar in many aspects but different on one important factor. Thus, from the merged results, case sampling follows. Also, I recommend a small number of cases (three or four) for comparison because of the added analysis needed for a cross-case comparison.

CONDUCTING MIXED METHODS INTEGRATION DATA ANALYSIS

How sampling is carried out, then, relates to its use within specific designs. Where integration occurs can be most easily seen by examining the core and complex designs. Integration represents a central component in mixed methods research. Before defining mixed methods integration related to designs, however, we are first going to examine the ways it is incorporated into mixed methods research.

Looking across all facets of the process of conducting a mixed methods study, we can see that integration occurs in multiple ways:

- *Integrative teams*. We form mixed methods teams and integrate methodological expertise by choosing teams members with strong quantitative, qualitative, and mixed methods skills.
- *Integrative questions*. We form integrated research questions or aims by stating quantitative, qualitative, and mixed methods questions or aims.
- *Integrated diagrams*. We draw an integrated diagram of our mixed methods design that shows the combination of the quantitative and qualitative procedures.
- *Integrated planning for a study*. We plan a study and design an integrated planning matrix that combines the quantitative and qualitative features (or strands) of our mixed methods research.
- *Integrated sampling*. We integrate our sampling by collecting both quantitative and qualitative data.
- *Integrated data analysis*. We integrate our data analysis by combining the data and representing them in a table or graph (joint display).
- *Integrated metainferences*. We draw integrative metainferences by developing conclusions from looking across both our quantitative and qualitative data.

There are many ways that we integrate in mixed methods research. In the last section, I focused on sampling and its integration. Now I am going to discuss specific ways that integration occurs in our mixed methods procedures (data collection and analysis) and relate these procedures to mixed methods designs (see Fetters, 2020). Following this, I will turn to metainference strategies that are based on drawing conclusions or inferences from the integration.

Defining Integration

Integration is the place in the mixed methods research process where the quantitative and the qualitative data intersect (or bump up against each other). Morse and Niehaus (2009) call this the point of interface, and they show arrows pointing to this interface in procedural diagrams to make it explicit. In the past, Bryman (2006) has noted that mixed methods studies seldom directly address integration. However, today it is a central feature, and we have learned much about describing this key component of mixed methods research. *Integration* might be seen as an alternative term for *mixing* or *combining* the data in mixed methods research. If we consider the qualitative and quantitative data and think about how we can mix or combine them, we can come up with many possibilities.

In general, I always introduce researchers to integration by saying there are three basic forms:

- We can *merge* or combine the two databases so that they are no longer distinct (as in a convergent design).
- We can *connect* the two databases so that they remain distinct but are related where one builds on the other (as in the explanatory sequential design or an exploratory sequential design).
- We can *embed* one or both of the databases into a framework or process (e.g., an experiment or intervention trial).

From my wording, I focus these points on the *procedures* for integrating the quantitative and qualitative data. To bring my point home, I often use metaphorically the procedure of baking a cake. When baking a cake, we prepare the batter by adding the flour, sugar, eggs, and salt into the mix. They become indistinct ingredients, like when qualitative and quantitative data merge in a convergent design. However, if we put raisins into the batter, they do not dissolve but remain intact even through the baking (and eating) process. In mixed methods explanatory and exploratory sequential designs, the qualitative and quantitative databases stay intact. When we are done baking the cake, we frost it, and this frosting covers all of the ingredients, much like when we add both quantitative and qualitative data into a complex mixed methods design framework or process.

The Intent and Procedures of Integration

Beyond these three general approaches to integration, we can look at the mixed methods designs and see the unfolding of more specific procedures. It is helpful to think about integration as both an anticipated outcome (intent) and a procedure. As shown in Table 8.1, I discuss both intent and procedures for each type of design. Integration intent means that the researcher is integrating in a specific design—the researcher plans on certain outcomes to occur. Integration procedures refers to the steps or procedures actually used to integrate the data to these outcomes within a design. For both intent and procedures, we have developed (adapted from the University of Michigan in our mixed methods workshops; also see Fetters, 2020) terms that are helpful, I believe, in understanding these two dimensions of integration.

In a convergent design, we intend to *compare* or *match* the results from the qualitative and quantitative analysis by the procedure of *merging* the results in a discussion or in a table (called a joint display to be discussed later in this chapter) where we can easily see this comparison. In an explanatory design, we intend to *explain* the quantitative results with qualitative data by using the procedure of *connecting* the two databases and using the results of the quantitative data to inform both the questions and the selection of participants for the qualitative

TABLE 8.1

The Intent and Procedures of Integration Within the Core and Complex Designs

Type of Design	Intent of Integration	Procedures for Integration
Convergent design	**Compare or match** the two results to confirm the results or to examine discrepancies between them	**Merge** the data by placing the results side by side in a table (e.g., joint display)
Explanatory sequential design	**Explain** the surprising, unusual, value-added results with qualitative data	**Connect** the qualitative data collection to the quantitative results to follow-up
Exploratory sequential design	**Explore** with the qualitative data to enhance the cultural specificity of the quantitative assessment	**Build or expand** the quantitative assessment by incorporating culturally specific qualitative findings
Complex designs	**Enhance** the framework or process by adding qualitative or quantitative data or both	**Embed** the qualitative and quantitative data into a framework or process

phase (as shown in a joint display). In an exploratory design, we intend to *explore* first with the qualitative data by the procedure of *building* or *expanding* the quantitative assessment to be context or population specific (again, shown in a joint display) In complex designs, we intend to *enhance* a framework or process by the procedure of *embedding* either quantitative or qualitative data or both into the larger framework or process (typically shown in multiple joint displays). How this occurs, of course, depends on the types of complex design (e.g., multiple case study, experimental study, evaluations study).

Using Integration Statements

I have taken the stand that it is useful to be specific about integration in a study and to mention it several times in the writeup. There needs to be an *integration statement* that conveys the expected outcome of the integration in a project or, more broadly, the reason for using both qualitative and quantitative data in a project. In Creswell and Plano Clark (2018), we have identified "scripts" that can be used to formulate this statement, and often this statement comes in the

study aims section or the methods section. Integration needs to be highlighted in a diagram of the design. Morse and Niehaus (2009) encouraged researchers to put a red arrow in these diagrams of design and have this arrow point to the place in the design where integration occurs (see Fetters, Curry, & Creswell, 2013).

Finally, mixed methods integration data analysis is a key component in mixed methods analysis. Mixed methods data analysis involves analyzing the qualitative data (i.e., codes, themes) and analyzing the quantitative data (i.e., statistical description and inferences). It also involves answering the mixed methods research question that asks about the outcome that will occur from combining the quantitative and qualitative procedures. For this, we turn to ways to present integration analysis through side-by-side comparison and through the popular joint displays.

Using Joint Displays to Represent and Analyze Integration

In the past, a popular way to analyze and represent integration is through a discussion in which the quantitative and qualitative results are arrayed one after the other, in parallel fashion in a discussion section. In this approach, the researcher discusses first the quantitative results and then the qualitative results (or vice versa) and indicates how these two results compare. An alternative would be to start with the qualitative results and follow with the quantitative results. After this, the researcher then discusses the results or conclusions from this side-by-side comparison.

A more popular recent approach is to develop a table or graph that illustrates the results from both databases. This table or graph is called a joint display. In a **joint display,** the researcher analyzes both the qualitative and quantitative data and then places the results in a table or graph that enables an interpretation (or drawing metainferences) of the relationship of the two databases. The form (construction and display) of this table or graph will differ depending on the specific mixed methods design. Gutterman, Fetters, and Creswell (2015) present an article on the use of joint displays in research and highlight several exemplars of core designs and the experimental complex design.

I discuss joint displays by providing a simple template that arrays the two databases in a table. A template can be useful in planning mixed methods studies, in acknowledging how the integration analysis will proceed in an application for funding, and in presenting integration in a graduate thesis or dissertation proposal. Joint displays are popular in mixed methods journal articles, and as shown in Table 8.2, we see a joint display template for a convergent design. In this template, I have arrayed on the vertical axis the quantitative scores on three categories (high, medium, and low) and on the horizontal axis the qualitative four themes. This allows us to merge (the procedure) the two data sets into a single table and make a comparison (intent) of the results. In the cells, we can place quotes, scores, or both so that we can make a comparison by looking across the rows or down the columns. For high-scoring participants, we can see how they

differ in perspective among the four themes. For the first theme, we can see how participants who scored high, medium, and low differed in their perspective on the theme. In a moment, I will discuss the column and rows labeled "inferences."

Another template, as shown in Table 8.3, illustrates a joint display for an explanatory sequential design. In this template, I have added hypothetical data to present a realistic picture. Notice that the columns follow the sequence of an explanatory sequential design, with quantitative data first followed by qualitative data. Finally, the interpretation as to how the qualitative results help to understand or explain the quantitative results appears in the final, third column. In the cells of this template, I have place summary conclusions about the hypothetical results.

TABLE 8.2

Joint Display Template for a Convergent Design

		Qualitative Themes				
		Theme 1	**Theme 2**	**Theme 3**	**Theme 4**	**Inferences**
Quantitative scores	**High**	Quote	Quote	Quote	Quote	Insight
	Medium	Quote	Quote	Quote	Quote	Insight
	Low	Quote	Quote	Quote	Quote	Insight
	Inferences	Insight	Insight	Insight	Insight	Insight

TABLE 8.3

Joint Display for an Explanatory Sequential Design

Quantitative Results	**Qualitative Follow-up Interviews Explaining Quantitative Results**	**How Qualitative Findings Helped to Explain Quantitative Results**
The more experienced the teachers, and the greater the use of the program materials, the higher the student scores.	Themes: More experienced teachers were willing to use the materials. More experienced teachers were able to blend the materials into their own approach. More experienced teachers were more willing to follow the school's approach.	Motivation and willingness surfaced as explanations. How the teachers blended the materials was highlighted in the explanations.

It should be helpful to see an actual joint display table that appeared in a journal article, as shown in Table 8.4. I will shift the design from an explanatory sequential design example to a mixed methods experimental/intervention design. This example was published in a journal article by Bradt et al. (2014) comparing the impact of music therapy (MT) versus music medicine (MM) interventions on psychological outcomes and pain in cancer patients. In this study, the authors embedded a core convergent design into the trial so that before and after each session, participants reported on their mood, anxiety, relaxation, and pain in terms of both qualitative and quantitative data. As shown in Table 8.4, we see on the left the two treatment groups (MT, MM) and their change scores for both groups after therapy sessions. On the right, we see the qualitative data about patient experiences. This table enables us to draw conclusions about the patient experiences when the benefits were different as well as similar.

TABLE 8.4

Joint Display of Patient Experiences per Treatment Benefit

Treatment benefits	Change in music therapy[a]	Change in music medicine[a]	Patient experiences
↑ MT, ↓ MM	0.65 to 1.88	−0.11 to 0.38	• Emphasize the importance of therapeutic relationship and support by therapist • Enjoy the creative aspect of music making • Are hopeful for the future
↑ MM, ↓ MT	−0.46 to 0.59	0.33 to 1.63	• Apprehensive about active music making • Prefer familiarity of pre-recorded music • Hesitant about exploring feelings related to cancer
↑ MT, ↑ MM	0.61 to 1.07	0.73 to 1.37	• Strong conviction about the power of music to support and give hope • Use music for mental escape • Use music for emotional exploration and value processing of emotions with therapist

Treatment benefits	Change in music therapy[a]	Change in music medicine[a]	Patient experiences
↓ MT, ↓ MM	−0.67 to −1.03	−0.52 to −1.06	• Hold little hope for the future • Music evokes sad and traumatic memories • Feel inadequate regarding music making and singing • Prefer aesthetics of original recordings

↑ great improvement, ↓ less improvement or worsening

[a]Range of overall *z*-scores (average of *z*-scores for mood, anxiety, relaxation, and pain)

Source: Used with permission from *Support Care Cancer* (Bradt et al., 2014).

These are examples of joint displays to represent integration of the quantitative and qualitative results. Examples such as these are appearing in published mixed methods studies. Other examples include information for sequential types of designs; graphic diagrams (e.g., geographical information system graphs of regions differing on certain quantitative variables and qualitative quotes or themes attached to the regions), participants by cases; and displays that show the transformation of qualitative data into quantitative counts.

DRAWING METAINFERENCES FROM THE INTEGRATION

The mixed methods sampling procedures are configured to fit the particular type of mixed methods design. Integration is also in the design, and the qualitative and quantitative data link in specific ways. From this linking, researchers often develop a table—called a joint display—in order to represent and analyze the link between the two databases. From this table, researchers then draw inferences—called metainferences—and see what conclusions result from linking the data. These conclusions can then be mentioned as additional insight to emerge from the mixed methods study that might not have been available from analyzing the qualitative and quantitative data.

Thus, the intent of a joint display and its integration analysis is to draw conclusions across the qualitative and quantitative databases. To do so, we draw **metainferences.** The term *metainferences* can be used interchangeably with *insight*, *conclusions*, or *interpretations.* Drawing metainferences provides

the value that a mixed methods research study rests on learning not only from our qualitative and quantitative data but also from their combination or integration.

Returning for a moment to Table 8.2, I have inserted a column and a row called "Inferences." This means that I will look down the column and across the rows to draw insights from the data. I will be looking for how participants who score high, medium, and low respond in a similar or different way to each theme. I will be looking across the row to see how the high-scoring participants might have responded in a similar or different way to the themes. I would strongly advise that you include in your joint display a column or row labeled "Inferences."

Now we can ask, "What types of inferences are concluded from this type of table?" We can look

- For differences and similarities
- How one expands on the other
- Insights compared to theory or conceptual framework
- Insights related to practice
- Insights related to the literature
- Insights for stakeholders

With regard to this last point, an article by Lyman et al. (2020) suggests the importance of drawing inferences from integration for social support for communities. This is often an overlooked element of drawing appropriate metainferences in mixed methods research.

After analyzing the integration in a study and drawing metainferences from the integration, the researcher needs to discuss the **value added by mixed methods research** to the study. This value can result from the enhanced insight obtained by combining the qualitative and quantitative research that would not be available if only one form of data is used (see McKim, 2017). It also comes from the integrative content results from using a mixed methods design—what the mixed methods approach contributed to understanding the problem in the study. It also comes from providing multiple views and standpoints that mixed methods brings through the collection and analysis of both quantitative and qualitative data. This metainference insight "mines" the databases in more depth. The value, then, can be stated in terms of the use of mixed methods, which adds more information and insight than a single approach to research (e.g., a qualitative approach or a quantitative approach), helping to understand the problem of the research in more depth and adding multiple perspectives from the use of extensive data.

RECOMMENDATIONS FROM THIS CHAPTER

This chapter has addressed three major procedures in mixed methods research: sampling, integration, and metainferences. These three procedures are tightly interwoven in mixed methods designs. When designing sampling in a mixed methods study, I recommend using both rigorous quantitative and qualitative approaches. Also, sampling procedures will differ depending on the type of mixed methods design. Integration in this chapter has focused on the intent for its use in generating outcomes and in its procedures. Integration, in general, means merging the two databases, connecting them with one building on the other or embedding the data into a framework or process. Again, the intent and procedures will differ depending on the specific mixed methods design. Researchers need to be specific in their mixed methods reports about these two facets of integration. Joint displays can be created to illustrate and help analyze the integration in a study. This analysis represents mixed methods data analysis. Finally, an often minimized aspect of mixed methods research is the drawing and use of metainferences. Researchers need to draw insight or conclusions from the integration and how it answers the mixed methods question. Metainferences assume many forms, and often researchers look for the differences or similarities of the data and provide explanations for the metainferences based on prior literature or theories. From the metainferences, researchers can state the value added by mixed methods in a project, such as adding more information or insight beyond a single methodology (e.g., qualitative or quantitative), helping to understand the research problem in more depth, and "mining" the databases of multiple perspectives.

ADDITIONAL READINGS

On qualitative and quantitative sampling:

Creswell, J. W., & Gutterman, T. C. (2018). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Boston, MA: Pearson.

Fowler, F. J., Jr. (2008). *Survey research methods* (4th ed.). Thousand Oaks, CA: SAGE.

Lipsey, M. W. (1990). *Design sensitivity: Statistical power for experimental research.* Newbury Park, CA: SAGE.

On integration:

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research, 6,* 97–113. DOI: 10.1177/1468794106058877

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs: Principles and practices. *Health Services Research, 48,* 2134–2156. DOI: 10.1111/1475-12117

Guetterman, T. C., Fetters, M. D., & Creswell, J. W. (2015). Integrating quantitative and qualitative results in health science mixed methods research through joint displays. *The Annals of Family Medicine, 13*(6), 554–561.

On metainferences:

Fetters, M. D. (2020). *The mixed methods research workbook: Activities for designing, implementing, and publishing projects.* Los Angeles, CA: SAGE.

Lyman, T., Damayanti, R., Titaley, C. R., Suharno, N., Bradley, M., & Krentel, A. (2020). Reframing integration for mixed methods research. *Journal of Mixed Methods Research, 14*(3), 336–357.

Writing a Mixed Methods Article for Publication

9

QUESTIONS ADDRESSED IN THIS CHAPTER:

- What mixed methods components should be included in a journal article?
- How does one structure a mixed methods article?
- What type of mixed methods article should be written?
- How does one locate a suitable journal for publication?

In this chapter, I turn to the specific task of writing up a mixed methods study for publication. My advice in this chapter is not limited to journal publications but would equally apply to research reports, theses, dissertations, and proposals for funding. However, primarily, the focus here will be on journal article publication. It is important to first consider what elements should go into a publication (or mixed methods study) and then identify the structure of the article to fit the type of mixed methods design used in the project. This is followed by considering the types of mixed methods publications that can result from a study, and the types we will consider are qualitative articles, quantitative articles, methodological articles, and overview mixed methods articles. In the field of mixed methods research, these mixed methods articles are further divided into methodological articles and empirical articles. Finally, locate a suitable journal for publication, and I will discuss different tiers of rigor, the publishing opportunities in the field of mixed methods research, and tips for approaching journals minimally supportive of mixed methods research.

ADDING MIXED METHODS COMPONENTS TO A PUBLICATION

What mixed methods components should a researcher write into a study for publication? There is no definitive answer to this question; however, in 2019, the American Psychological Association issued **standards for publishing a mixed methods journal article** in an American Psychological Association journal or affiliated journal (89 peer-reviewed journals and 4,000 articles; https://www.apa.org/pubs/journals). These standards were developed by the American Psychological Association (APA) and the Communications Task Force on Journal Article Reporting Standards for Qualitative Research (JARS-Qual Working Group) (American Psychological Association, 2019; Levitt et al., 2018). Meeting in 2017, the six-member working APA group consisted of qualitative and mixed methods with a primary emphasis in psychology. The task force recommendations for "standards" included three categories: for qualitative research, for meta-analytic qualitative research, and for mixed methods research. The "standards" were first published in the *American Psychologist* (Levitt et al., 2018) and issued in the fall of 2019 in the APA's *Publication Manual* (2019) and the APA Style CENTRA, an online program to support the *Publication Manual.* Thus, for the first time in the history of the *Publication Manual,* qualitative and mixed methods "standards" were included, and because of the widespread use of this *Manual,* mixed methods research has reached a wide interdisciplinary, global audience.

One table in this *Manual* advanced elements of mixed methods research to be included in a journal publication (see Levitt et al., 2018). In my summary, as shown in Table 9.1, the recommendations followed the key mixed methods sections typically found in a journal article. These elements are consistent with the essential characteristics of mixed methods research I discussed in Chapter 1, and they reflect as well the "quality" dimensions that will be presented in detail in Chapter 10.

TABLE 9.1

Key Elements to Be Included in a Mixed Methods Journal Publication

Section of the Publication	Key Elements
Title	Include words *mixed methods* or *qualitative and quantitative research.* Refrain from using words that signify quantitative or qualitative research.

Section of the Publication	Key Elements
Abstract	Include mixed methods aspects such as design, quantitative and qualitative data, analysis, results, and implications.
Introduction	Identify a need for both quantitative and qualitative data. State quantitative, qualitative, and mixed methods aims/questions. Define mixed methods. Identify the mixed methods design used in the study.
Participants, data sources, and data collection	State the quantitative and qualitative data sources and order them according to the design. Indicate researchers' experiences with mixed methods research. Discuss quantitative and qualitative sampling separately.
Data analysis	Create separate sections for quantitative, qualitative, and mixed methods data analysis. Integrate the quantitative and qualitative data for mixed methods data analysis.
Validity	Report quantitative and qualitative validity. Indicate the validity of inferences drawn using the mixed methods design.
Findings/ results	Report quantitative and qualitative results/findings. Indicate the results of integrating the data, using joint displays, graphs, or data transformation procedures.
Discussion	Present the results/findings in the order of the mixed methods design. Reflect upon the implications of the integrated findings.

Source: Adapted from the APA Publication Manual (2019) with permission. APA is not responsible for the accuracy of this translation.

I offer now a different way to present the mixed methods elements to be included in a journal article. I had certain important elements that I looked for when I served as co-founding editor of the *Journal of Mixed Methods Research* (2007 to 2011). Here is how I would assess the writing quality of mixed methods elements in manuscripts submitted to the journal (that I still use today as a reviewer):

- I first looked at the methods section to see if the study contained both qualitative and quantitative data in response to the research question.

- I then looked throughout the article to see if the authors actually "integrated," or combined, the two databases. In a good mixed methods study, the databases are integrated. I will admit that sometimes it was difficult to determine how and in what way the authors actually "integrated" the two databases. A look at the results and discussion sections often helped to locate this aspect of the study.
- Next, I looked for whether the author or authors were familiar with the mixed methods literature and actually cited recent mixed methods books or articles.
- Finally, I was curious about the mixed methods features that the authors had embedded in the study. For instance, did they state a rationale for why they were using mixed methods research and integrating both quantitative and qualitative data? Did they mention "mixed methods" in the title? Did they have features such as mixed methods questions or joint displays? Was the study more of a methodological article or an empirical study that used mixed methods? These additional features established a study as a rigorous mixed methods project.

STRUCTURING A MIXED METHODS ARTICLE

By examining published mixed methods journal articles, it is apparent that the structure of published empirical mixed methods studies varies considerably. A close review of these structures, however, shows that they vary from one type of design to another. My thinking about how to discuss the structure of the different designs came from a question by a student in my Harvard University mixed methods class in 2014. He asked, "I am conducting a convergent design. How to I write the study for publication?

One answer to this question is to examine the structure of mixed methods published studies in major refereed journals. I suggest locating about 20 studies incorporating the design being proposed in a study (e.g., a convergent design). Look closely at the results and discussion sections, and study the flow of ideas. This analysis will produce, I believe, a picture of the structure for a specific design. I have done this, and the following discussion highlights the structures that I have found for the major types of mixed methods research designs. Two points are important:

1. The **writing or compositional structure** needs to match the type of design and, more specifically, the order of the quantitative, qualitative, and integrative phases of the research design. In a convergent design, either quantitative or qualitative can be presented first. In the

sequential designs (explanatory sequential and exploratory sequential), the first phase will be different.

2. The mixed methods components can typically be found in the *methods, results,* and *discussion* sections of a manuscript. Thus, in the examples that follow, these sections will be italicized.

Convergent Design Structure

A convergent design is one that merges the quantitative and qualitative databases in order to generate interpretations of key common questions. Before the two databases are brought together, the researcher collects and analyzes each database separately. Therefore, in the *methods* section of a mixed methods publication on a study using a convergent design, one would have separate quantitative and qualitative *data collection* and *data analysis* sections for quantitative and qualitative data. It does not make any difference whether quantitative or qualitative research comes first in these two sections; the idea is simply that they are separate. Results are reported for the analysis of each type of data separately in the *results* section of the report. Statistical results and the thematic qualitative results are reported. A joint display constitutes the mixed methods analysis, and this joint display may be found in the *results* section or the *discussion* section of a study.

Alternatively, the mixed methods results section can contain a side-by-side comparison passage. The *discussion* section first mentions the general quantitative and qualitative results, then presents the interpretation or metainferences drawn from the integration. In addition to these metainferences, the researcher comments on the value added by the metainferences by using mixed methods research. Also, the researcher presents limitations of the study, the available literature, and directions for future research.

Explanatory Sequential Design Structure

In an explanatory sequential design, the project begins with a quantitative phase, which is then followed by a qualitative phase that helps to explain the quantitative results. Thus, in a written manuscript using this design, the *methods* section should first cover the quantitative data (e.g., instruments) and then the qualitative data (e.g., interview procedures and questions). Next, the *results* section should include three parts in this order: (a) the discussion about the quantitative statistical results, (b) the discussion about what elements of the quantitative results need to be further explained (e.g., significant results, nonsignificant results, outliers, demographics), and (c) the qualitative results that help to explain the quantitative results. The integration occurs between the initial quantitative phase and the follow-up qualitative phase, so the results could present a joint display that illustrates the connection between these two phases. The *discussion* section might then reinforce this order of ideas by summarizing the major elements in all three

steps that reflect the flow of ideas in the design and mention the metainferences from integrating the two databases, the value of these metainferences, and other features, such as limitations of the study, the available literature, and directions for future research.

Exploratory Sequential Design Structure

An exploratory design starts with the qualitative, exploratory phase to obtain specific culture or setting information and builds into a second, quantitative phase of developing a context-specific quantitative assessment, such as creating a new or modified instrument or designing practical intervention activities. Then a third, quantitative phase tests the instrument or materials with a large sample of a population. The writing structure for this type of design would include a *methods* section that presents the qualitative data collection first followed by the quantitative data collection and analysis. The *results* section would have three parts: first report on the qualitative findings, then describe the development of the quantitative assessment (e.g., modified instrument) based on the context-specific qualitative findings, and finally report on the quantitative results of testing out the assessment. A *discussion* section would repeat this order of sections in a brief form and highlight the metainferences drawn from integrating the data in the first and second phases. It would also mention the value added by integrating the two databases, as well as other features, such as limitations of the study, the available literature, and directions for future research.

Mixed Methods Experimental Design Structure

I will present two complex designs to illustrate their structures. I refer you back to Figure 6.1, which presents a process model for embedding core designs into complex designs. This figure helps to think about the structure of an experimental mixed methods article. Recall also that qualitative data may come into the experiment before, during, after, or some combination of these points. At these points, one or more core mixed methods designs embed into the experiment. The *methods* section needs to include a discussion of the experiment (e.g., groups, selection, treatment, outcomes), as well as information about when and what type of qualitative and mixed methods core design(s) enter the experiment. The *results* section would first present the outcome results of the experiment as well as the qualitative themes. The order of presentation of these topics depends on how the qualitative data and core design are embedded in the experiment. A joint display section would convey the results of the integration of the qualitative data with the experimental data. In the *discussion,* the writer then reviews the experimental results, evaluates the qualitative findings, and then adds information about the metainferences of integration between the quantitative and qualitative data, as well as the value of integration for the study. This is followed by the other features of limitations of the study, the available literature, and directions for future research.

Mixed Methods Participatory Action Research Design Structure

In this mixed methods design, participatory action research becomes an overarching framework threading throughout the study. The core idea is that participatory action research involves engaging stakeholders in many stages of a study (e.g., from questions to interpretations). An ideal writing structure, then, places the action research process at the center of the discussion, and there would be steps in using this process (see again, Figure 6.1). The core design(s) would flow into this process at the stages when the researcher collects and analyzes both quantitative and qualitative data. The *methods* section would start with the participatory action framework and its steps and then discuss the points in the steps where the researcher plans to collect both quantitative and qualitative data. Likewise, the *results* would first discuss the learning from each step in the participatory framework and then turn to the quantitative and qualitative results, followed by the integrative mixed methods results. The *discussion* section would briefly identify the results of each step in the process and then discuss the integration of the two databases and the metainferences drawn from the databases. Further, the value of using mixed methods should be mentioned in the discussions, as well as other features, such as limitations of the study, the available literature, and directions for future research.

In summary, the structure of complex designs involves first discussing the results of the framework or process in the study, followed by the quantitative, qualitative, and integrative information. In discussions, identify the value of mixed methods in the study. This structure would hold true for all of the complex designs—experiments, participatory action research studies, multiple case studies, and evaluation projects as discussed in Chapter 6.

DECIDING ON THE TYPE OF MIXED METHODS ARTICLE TO WRITE

In deciding what type of mixed methods article to publish, I recommend considering dividing the mixed methods study into its parts and publishing each part, as well as reviewing the types of mixed methods studies as advanced in major mixed methods journal publications.

Publish Different Parts of a Mixed Methods Study

One of the advantages of mixed methods research is that the author can publish various parts of the mixed methods separately in distinct papers. These papers are different papers, so they cannot be challenged as duplications or mining a single database in multiple ways. Cross-references, however, are needed from one paper to the next.

I feel that from one mixed methods project, the author can publish the following:

- The quantitative strand of the mixed methods study as a separate paper
- The qualitative strand of the mixed methods study as an individual paper
- The overview mixed methods paper that will require shortening the data collection, the data analysis results, and the interpretation or metainferences. Often journals will provide the opportunity for authors to post information (e.g., extra methods, extra results) online. Alternatively, some journals allow for extensive length in the manuscript (e.g., the *Journal of Mixed Methods Research* allows for 10,000 words for a manuscript submission as an empirical study).
- A methods article that discusses the innovative mixed methods features of a study. For example, this article could be a *protocol* paper, a *systematic review* paper, or a paper advancing a specific topic in the field of mixed methods research (see later my discussion about methodological papers for the *Journal of Mixed Methods Research*). The challenge for the researcher is that this type of paper requires knowing the field of mixed methods research and following closely the development of specific topics so that the case can be made of the innovative nature of the manuscript.

As an example of creating multiple publications from a single line of research, I often point to the series of studies addressing mammogram screening in the country of Chile (Püschel, Coronado, et al., 2010; Püschel & Thompson, 2011; Püschel, Thompson, et al., 2010). From one study, the authors produced three publications—a qualitative article, a quantitative article, and a mixed methods article—and each article was quite distinct and published in different journals, as shown in Figure 9.1.

Another way is to consider how to publish the various strands from a mixed methods project. Stange, Crabtree, and Miller (2006) recommended five strategies that have been popular in primary (health) care:

- Publish quantitative and qualitative studies separately, but cross-reference the articles.
- Publish concurrent or sequential quantitative and qualitative papers in the same journal. A few journals will permit this multiple-paper approach.

FIGURE 9.1

Three Published Articles From One Mixed Methods Project (Püschel, Coronado, et al., 2010; Püschel & Thompson, 2011; Püschel, Thompson, et al., 2010)

- Publish an "integrated" article but place additional details in an appendix or online resource site. I consider this article the "overall" mixed methods study, and it can be shortened by placing methods details elsewhere.
- Publish separate qualitative and quantitative papers, and then publish a third paper focused on "overarching lessons." This last article will be an "overall" mixed methods study that is longer and includes a detailed methods section.
- Publish your results in an online discussion. This is an attractive format for long manuscripts. Journals that publish empirical research studies online are becoming more popular.

Review the Types in a Major Mixed Methods Journal

One way to understand the various types of mixed methods articles to write would be to consult with the major mixed methods journals and see what types are recommended to authors submitting articles to the journal. Typically, the sections on submitting articles to the journal webpages contain guidelines for types of articles accepted by the journal. For example, consider the *Journal of Mixed Methods Research*. The homepage of this journal (found at journals.sagepub.com)

contains submission guidelines for authors. Then, in a series of editorials, the editors offered specific recommendations for submission that advance the major orientation of the journal as well as the two primary types of articles published. In one of the editorials, the editors clearly state that the journal is a methodological journal, and as such, all articles must contribute to the advancement of mixed methods research methodology (see Fetters & Freshwater, 2015; Fetters & Molina Azorin, 2019b). Further, the editors then announced the two types of publications:

- **Empirical methodological mixed methods research articles** (or original research articles). These are research articles that present a study in the author's field and use mixed methods research. They substantially contribute to the researcher's field of inquiry. They still need to meet the definition of mixed methods research, explicitly integrate the quantitative and qualitative aspects of the study, and add to the literature on mixed methods methodology. To conduct an empirical study requires extensive knowledge of a content area within the researcher's field as well as the appropriate steps and features of a good mixed methods project (see Chapter 10 for more information on quality of mixed methods research).
- **Methodological/theoretical articles** may address such topics as types of research/evaluation questions, types of design, sampling and measurement, data analysis, integration methods, research integrity and validity, software, paradigm issues, writing structure, the value of mixed methods, and understanding mixed methods within diverse settings. Also included in this category of methodological/theoretical articles are reviews and prevalence studies that examine the frequency of mixed methods studies in specific fields or topics. To write a methodological/theoretical article requires a substantive knowledge of the field of mixed methods and its specialized topics.

LOCATING A SUITABLE JOURNAL

I have several recommendations for locating a suitable journal for a mixed methods study.

- Search for a journal. Conduct a search for a suitable journal by using a software program such as Jane (Journal Author Name Estimator; jane.biosemantics.org) by inserting your topic and mixed methods into the search field. Also, search the social and health science databases by looking for journals using a topic and the term, mixed methods, or quantitative and qualitative research.

- Study examples of journal publications. Once articles are located, thoroughly review sample articles for key features such as length, number of tables and figures, appropriate headings to use, structure for presenting abstracts, and the members of the editorial board.
- Consider also the acceptance rate of the journal and whether the journal is one likely to publish a mixed methods study. Fetters (2020) suggests looking for journals that might be a stretch (10–30% acceptance rate), good-fit journals (40–60% acceptance rate), and safety journals (+70% acceptance rate). A good way to see the standards is to examine the impact factor of a journal, which is a way to judge the relative importance of a journal (see, e.g., https://researchguides.uic.edu/if/impact).
- Consider journals that may publish a mixed methods study: journals that publish only mixed methods research, such as
    a. *Journal of Mixed Methods Research*
    b. *International Journal of Multiple Research Approaches*
    c. *International Journal of Multiple Research Approaches* (online journal)
    d. *Field Methods*
    e. *Quality and Quantity*

There is also a growing list of journals in the social and health sciences that are friendly to mixed methods research, such as the *International Journal of Social Research Methodology, Qualitative Inquiry, Qualitative Research, Annals of Family Medicine, British Medical Journal,* and many others.

I recommend the following tips for approaching journals that may be unfriendly or marginally supportive of mixed methods research. For these journals, I recommend first contacting the editor to see if the journal is open to diverse methodologies in general and mixed methods specifically. If the journal is open, send a letter to this editor that includes references to mixed methods publications in leading journals. Also, reference the recent "standards" issued by the American Psychological Association discussed earlier in this chapter and the "best practices" of the National Institutes of Health, to be discussed in Chapter 10. Also, look for journals with editorial board members who have published in the field of mixed methods research. Realize that an initially targeted journal may not be a good choice for the mixed methods article, and other journals need to be considered.

RECOMMENDATIONS FROM THIS CHAPTER

Our first consideration was what mixed methods components should a researcher write into their study for publication. I first turned to the "standards" for mixed method research published by the American Psychological Association. These "standards" present the key elements that should go into every major section of a journal article. Then I added to these elements my own thoughts about reviewing mixed methods articles as the coeditor submitted for possible publication in the *Journal of Mixed Methods Research*. After considering the components, the next step is to create a structure for organizing the study. For this, I advise to the review the structure that I have found in published studies for the core designs as well as the complex mixed methods design. For discussing this structure, I turned to the methods, the results, and the discussion sections of each type of design. Further, consideration needs to be given to the type of mixed methods article to write, recognizing that a single mixed methods project might be divided into several articles: a quantitative article, a qualitative article, the overview mixed methods article, and a methodological article if the study presents some innovative approaches to add to the field of mixed methods research. Examples of publishing multiple studies from a single project can be found in the literature. The empirical mixed methods study in which the researcher adds to the literature in the scholar's field and uses mixed methods procedures to conduct the study is a popular type of mixed methods study. Another type is the methodological/theoretical article that advances the knowledge of mixed methods on topics such as study design, validity, diversity, and others. Both empirical research articles and methodological/theoretical articles are encouraged by the *Journal of Mixed Methods Research.* Finally, locating a suitable journal takes time and requires a strategic plan. Find one or more journal articles in the literature through a database search. Then, study the articles closely to learn their structure and organization in order to enhance the acceptability of a study. Also, consider the acceptance rate for a targeted journal and realize that acceptance rates differ and that some journals might be a stretch, others a good fit, and others a safety journal that would be likely to accept an article. For methodological/theoretical articles, several journals that specialize in publishing studies contribute to the field of mixed methods research. Some journals may not be open to a mixed methods study, and I suggest some tips for reaching out to the editors of those journals.

ADDITIONAL READINGS

To learn more about the American Psychological Association "standards," read the following:

Levitt, H. M., Bamberg, M., Creswell, J. W., Frost, D. M., Josselson, R. & Suárez-Orozco, C. (2018). Journal article reporting standards for qualitative primary, qualitative meta-analytic,

and mixed methods research in psychology: The APA Publications and Communications Board task force report. *American Psychologist, 73*(1), 26–46.

To see how one research team published a quantitative article, a qualitative article, and a mixed methods article from the same project in different journals, review the following:

Püschel, K., Coronado, G., Soto, G., Gonzalez, K., Martinez, J., Holte, S., & Thompson, B. (2010). Strategies for increasing mammography screening in primary care in Chile: Results of a randomized clinical trial. *Cancer Epidemiology, Biomarkers & Prevention, 19*(9), 2254–2261. DOI: 10.1158/1055-9965.EPI-10-0313

Püschel, K., & Thompson, B. (2011). Mammogram screening in Chile: Using mixed methods to implement health policy planning at the primary care level. *Breast, 20,* 40–45. DOI: 10.1016/j.breast.2011.02.002

Püschel, K., Thompson, B., Coronado, G., Gonzalez, K., Rain, C., & Rivera, S. (2010). "If I feel something wrong, then I will get a mammogram": Understanding barriers and facilitators for mammography screening among Chilean women. *Family Practice, 27*(1), 85–92. DOI: 10.1093/fampra/cmp080

For the types of mixed methods studies published in the *Journal of Mixed Methods Research,* see the following editorial:

Fetter, M. D., & Molina-Azorin, J. F. (2019a). A checklist of mixed methods elements in a submission for advancing the methodology of mixed methods research. *Journal of Mixed Methods Research, 13*(4), 414–423.

For a detailed discussion about writing and reporting a mixed methods study, see the following:

Fetters, M. D. (2020). *The mixed methods research workbook: Activities for designing, implementing, and publishing projects.* Los Angeles, CA: SAGE.

O'Cathain, A. (2009). Reporting mixed methods projects. In S. Andrew & E. J. Halcomb (Eds.), *Mixed methods research for nursing and the health sciences* (pp. 135–158). West Sussex, UK: Blackwell.

Evaluating the Quality of a Mixed Methods Study

10

QUESTIONS ADDRESSED IN THIS CHAPTER:

- Where can a researcher find standards of quality?
- Should we have standards to judge quality?
- What standards are recommended by the U.S. federal government and private foundations?
- What standards are recommended by an international sample of mixed methods researchers and by journals in the mixed methods research literature?
- What standards would I recommend?

In this chapter, I summarize many of the features that I have introduced in prior chapters. I also frame these features in terms of thinking about the quality of a mixed methods study. Different standards exist, and some scholars challenge whether they should exist at all, but recent developments looking at quality standards have been published, and I would be remiss if I did not end this book with the key features that I believe constitute a good, rigorous mixed methods study.

LOCATING STANDARDS OF QUALITY FOR MIXED METHODS RESEARCH

As the field of mixed methods continues to mature, it is only natural for writers and scholars to begin to consider standards or guidelines for assessing the quality of mixed methods studies. A mature scientific field does have standards of quality that scholars use to assess projects and to evaluate a study. Sometimes they are

written and available; sometimes they are implicit. Often, disagreement exists about what constitutes quality and whether individuals from different disciplines and fields can agree on the quality characteristics. This is especially the case since mixed methods research is interdisciplinary and international in orientation. What has emerged to date in mixed methods has been a number of standards that individuals use—whether they are from journals or funding agencies or individual criteria that faculty and students might impose. Unquestionably, mixed methods continues to develop, and today we have indicators of quality that must be openly discussed.

Journals typically include a page in their guidelines for authors listing the criteria that reviewers use to assess the quality of manuscripts. Sometimes these guidelines are highly detailed; at other times, they are more abstract and general. In the mixed methods field, the journals to which authors submit their methodological or empirical articles (see Chapter 9) have guidelines reviewers use to assess the quality of manuscripts. Also, funding agencies set forth the criteria that their reviewers will use to assess an application or proposal for funding. These criteria are often published in easily accessed websites. For book publishers, we can look to certain websites (e.g., http://mmr.sagepub.com) to find several guidelines for quality in mixed methods today.

Finally, faculty advisers have standards that they use to assess the quality of doctoral dissertations, theses, and research reports. Sometimes these standards reflect their interest in good prose, or they may speak to specific content topics (e.g., is the literature adequately reviewed?). With mixed methods as a relatively new methodology, and with the availability of a growing list of mixed methods courses offered on college and university campuses, faculty may have a firm list of standards they use to evaluate a mixed methods study. They may rely on published standards from journals, from guidelines advanced by federal agencies, or even from journal articles on quality in mixed methods. Whether a consensus exists about quality standards remains to be seen, and the question remains: Should we have standards of quality in mixed methods research?

DETERMINING IF STANDARDS ARE APPROPRIATE

Scholars are quite divided on this issue. It is helpful to review the pros and cons of using standards to assess the quality of mixed methods research. On the positive side, it is true that reviewers of journal articles need some standards to apply when they review a mixed methods project. With a large editorial board and many occasional reviewers who help to assess manuscripts, having some standards is helpful. The same applies to reviewers for federal funding agencies (and private foundations). With many reviewers on board to review applications, the agencies have published standards so that arbitrary decisions are not made as to whether a mixed methods study is funded or not.

Also, on the positive side, standards seem to have a different reading from field to field. In the health sciences, the use of standards is pervasive, whether these are protocols for screening, diagnosis, or surgical procedures. Protocols are a way of life for those working in the health sciences. Therefore, having standards in mixed methods makes sense and is quite within the working life of the health science clinician and researcher. In the social sciences, on the other hand, protocols, checklists, and standards are less likely to be used. The social science researcher may use an instrument developed by another scholar, but likely the instrument will be adapted to "fit" the culture and context of the participants under study. For example, in international global research, local conditions greatly affect the research process. Qualitative researchers in the social and behavioral sciences have for years believed in an open-ended process of gathering information that allows participants to provide their views rather than restricting them through a predetermined set of questions or instruments, often based on Western ideas. Quantitative researchers are more inclined to use and believe in standards, and they operate on the assumption that patterns of behavior, for example, fit into some ordered sequence that can be measured and assessed, regardless of the specific context of the individuals. Finally, another positive argument for standards often comes from beginning researchers who need to have clear guidelines for how to proceed and how their work will be evaluated. They do not have the experience to innovate and create because they are simply not familiar with the ground rules. Experienced researchers, too, need to have standards to be confident that their studies are warranted and transparent (Collins, Onwuegbuzie, & Johnson, 2012; Fàbregues & Molina-Azorin, 2016).

The negative side for having standards is an ever-present force in this discussion. Guidelines are creations of individuals, groups, funding agencies, faculty committees, and so forth. Who is capable of deciding whether these individuals and groups know what they are doing? It becomes a question of power and of who controls the generation of knowledge. Sometimes the individuals generating the guidelines are after their own good; they may want to control the nature of research to advance their own agendas. Thus, guidelines can sometimes lead to undesirable outcomes.

Another negative side of guidelines is that they create a structure around what is acceptable and what is not. This may limit the creativity of individuals and actually slow down the adoption of mixed methods. Experienced researchers may feel the need to fashion their mixed methods project within the guidelines, thus limiting the uniqueness that they may bring to mixed methods. Unquestionably, experienced researchers do not like to be bounded by standards and desire freedom in creating their own projects. These researchers may attempt to master the basics of a methodology and then wish to create projects outside of these structures to advance their studies.

Arguing against standards or guidelines is the idea that there is simply no agreement on what these guidelines should be. Bryman (2014) noted the lengthy list of quality considerations in the mixed methods community because

researchers try to be comprehensive and to reconcile different perspectives. The classic case in mixed methods was the article by Johnson et al. (2007), which attempted to forge a single definition of mixed methods by asking 19 different scholars for their working definition. As one reads through these definitions, we see that on something so basic as a definition of mixed methods, scholars differ, and that a consensus is difficult to achieve.

My particular stance lies more in the direction of having standards of quality for mixed methods. I feel that

- Standards will advance the field of mixed methods by providing reviewers and evaluators with a set of guidelines that can be helpful in assessing quality.
- Standards are imperative in the health sciences, where guidelines and protocols are central to clinical and medical practice and research.
- Standards need to be generally stated to allow the broadest application possible across the social, behavioral, and health sciences.

Consequently, my books provide checklists and discussions about the array of evaluation standards being used, and I have included these because of my work in the health and social sciences with beginning scholars. My personal checklist is found at the end of this chapter after I have reviewed standards of quality being discussed in the literature.

ASSESSING STANDARDS OF QUALITY IN THE LITERATURE

I will review three sets of standards before advancing my personal checklist. First, I will turn to standards raised by U.S. foundations and federal agencies in recent years. Then, I will review emerging recent research studies examining the use of quality standards in journals and by experts.

Assessing Quality Standards From the U.S. National Government

Research standards are not new to journals, funding agencies, private foundations, disciplines or fields, or workshops. What is new, however, is their entrance into mixed methods. For example, the National Science Foundation issued the *2002 User-Friendly Handbook for Project Evaluation* (www.nsf.gov/pubs/2002/nsf02057/start.htm), which contained a section on mixed methods evaluations. In 2008, the Robert Wood Foundation's website for the Qualitative Research Guidelines Project (www.qualres.org/) provided a practical set of guidelines for the qualitative component of mixed methods projects. These guidelines not only were used as a model for designing website research methods content but

also provided the National Institutes of Health (NIH) Office of Behavioral and Social Science helpful suggestions in identifying "best practices" for qualitative methods (as mentioned below). In 2010, USAID issued tips for conducting mixed methods evaluations, and articles have been written about basic guidelines for mixed methods research in medical education (Schifferdecker & Reed, 2009). Workshops help to advance how mixed methods is being used and conducted; an example is the 2012 NIH workshop on "Using Mixed Methods to Optimize Dissemination and Implementation of Health Interventions."

In 2011, the NIH issued recommendations for "best practices" in mixed methods research ("Best Practices for Mixed Methods Research in the Health Sciences") and then updated these recommendations in 2018 (http://obssr.od.nih.gov/mixed_methods_research/; NIH, Office of Behavioral and Social Sciences, 2018). These recommendations flowed from an NIH Office of Behavioral and Social Science Research (OBSSR) working group in 2010 of 18 individuals representing NIH institutes, program officers, and mixed methods specialists in the social, behavioral, and health sciences. This working group was chaired by myself, Ann Klassen of Drexel University, Vicki Plano Clark of the University of Cincinnati, and Kate Smith of Johns Hopkins University (Creswell et al., 2011). Early in the design of these recommendations, it was felt that the "**best practices**" **for mixed methods research in the health sciences** should address the basic features important in this methodology. They advance recommendations for writing a mixed methods application for the various NIH granting mechanisms (R grant, K grant, Center grant, and so forth) and establish criteria that evaluators might use when reviewing an application for funding for mixed methods research. It was also acknowledged early in the deliberations that the 2001 NIH OBSSR report, *Qualitative Methods in Health Research: Opportunities and Considerations in Application and Review,* which contained a short section on mixed methods studies, was not sufficient to reflect the current state of the art in mixed methods research.

The final report, an update in 2018, provides recommendations for conducting mixed methods research in the health sciences (NIH, Office of Behavioral and Social Sciences, 2018). The updated version contains the same content as the 2011 version but provides more information on specific projects funded and resources. The topics of the report reflect this triple orientation toward informing the reader about the nature of this form of inquiry, giving suggestions for writing applications, and providing a checklist for reviewers to use. This checklist at the end of the report is most informative, and it provides a good summary of quality criteria to include in applications for funding and for reviewers to use. I produce an adapted version here, as shown in Table 10.1. This table indicates the best practices by the NIH categories used for planning and reviewing an application for funding. The report was loaded onto an NIH website and is available for authors in both the health and social sciences. Its impact has been profound, and the 2018 report indicates that this best practice report has been the most frequently visited page on OBSSR's website since its release in 2011.

TABLE 10.1

"Best Practices" Sample Criteria and Strategies for Reviewing R Series Applications

NIH Criterion	"Best Practices" Strategies for Meeting Criterion	NIH Scoring
Significance	Does the application provide a convincing case that the problem is relevant? Is the problem best studied through mixed methods research?	1–9
Investigators	Do the investigators have required skills to conduct mixed methods? Is project leadership committed to mixed methods research? Has the application described collaboration?	1–9
Innovation	Is the mixed methods an innovative investigation of the problem? Is the combination of methods or integration innovative?	1–9
Approach	Is there a description and use of philosophy and theory? Is there a convincing explanation for use of mixed methods? Is there a clear description of design and integration in the design? Is integration well described? Is the design appropriate for the aims? Is the quantitative and qualitative research rigorous? Does the study include the use of computer software? Is the study feasible?	1–9
Environment	Does the sponsoring institution support mixed methods?	1–9

Source: Adapted from NIH: Office of Behavioral and Social Sciences (2018).

Assessing Quality Standards From Researchers and Journals

A close examination of the NIH recommendations in Table 10.1 indicates another feature worth noting. The specific strategies intermingle good research practice (e.g., "Does the study provide a convincing case that the problem is relevant?") and strategies specific to quantitative and qualitative research (e.g., "Is the quantitative and qualitative research rigorous?"). An important insight emerged from Fàbregues and Molina-Azorin's (2016) review of past criteria in the literature. They noted that the criteria were not restricted to procedural aspects in mixed methods but also intermingled quantitative and qualitative criteria and general research criteria (see, e.g., O'Cathain, Murphy, & Nicholl, 2008b). While good mixed methods studies need to follow standards for rigorous research and for both the quantitative and qualitative approaches, the criteria become difficult, especially for the beginning researcher, to distinguish the mixed methods criteria from others. This reduces the impact of the criteria listing, and my list of criteria stated at the end of this chapter highlights only mixed methods procedures.

Fábregues and Molina-Azorin's (2016) study and the later study by Fábregues, Paré, and Meneses (2019) provide criteria more closely aligned with mixed methods procedures. They assessed quality criteria by interviewing international mixed methods researchers and by examining numerous mixed methods publications in journal articles. In Table 10.2, I summarize the major findings of their two studies. In these studies, the authors provide an empirical assessment of quality.

TABLE 10.2

Quality Criteria From Journal Articles and Scholars

Study Phase	Mixed Methods Journal Articles in 17 Methods Journals (*N* = 64 articles) (Fàbregues & Molina-Azorin, 2016)	Mixed Methods Researchers (*N* = 44) in Education, Nursing, Psychology, and Sociology (Fábregues, Paré, & Meneses, 2019)
Planning	A rationale is provided	A rationale is provided
	Clear philosophical assumptions	
	Clear purpose and questions	Clear purpose and questions
	Literature situates the study	
	Literature on mixed methods research reviewed	

(Continued)

TABLE 10.2 (CONTINUED)

Study Phase	Mixed Methods Journal Articles in 17 Methods Journals (*N* = 64 articles) (Fàbregues & Molina-Azorin, 2016)	Mixed Methods Researchers (*N* = 44) in Education, Nursing, Psychology, and Sociology (Fábregues, Paré, & Meneses, 2019)
		Clear mixed methods research design
		Mixed methods research questions
Undertaking	Quality quantitative and qualitative components	Quality quantitative and qualitative components
	Integration of quantitative and qualitative	Integration of quantitative and qualitative
	Design is linked to aims/questions	Design is linked to aims/questions
	Sampling, data collection, analysis linked to aims/questions	
	Sampling, data collection, analysis detailed	
	Design matches the rationale for combining	
		Congruent quantitative and qualitative components
Interpreting	Inferences consistent with findings	Inferences consistent with findings
	Inconsistency in findings/ inferences stated	Inconsistency in findings/ inferences stated
	Inferences consistent with aims/questions	
	Inferences incorporated into metainferences	
Dissemination	Transparent research process	Transparent research process
	Value for policy and practice explained	Value gained described
		Literature cited

Source: Adapted from Fábregues & Molina-Azorin (2016) and Fábregues, Paré, & Meneses (2019).

In one article, they reviewed mixed methods journal articles, books, and dissertations in which authors have discussed quality criteria from 64 published articles spanning pre-2005 to 2016 (Fàbregues & Molina-Azorin, 2016). In the second article, they interviewed 44 international mixed methods researchers representing the disciplines of education, nursing, psychology, and sociology (Fábregues et al., 2019). They organized and presented their criteria using stages in the processes of research such as the planning, undertaking, interpreting, and disseminating phases. They also found highly similar criteria from their sources that reinforced prior literature on quality (e.g., Bryman, 2014). Of special note is their innovative criteria related to metainferences and to the value of mixed methods for policy and practice.

I feel that it is useful to also review the criteria set forth by the editors of major mixed methods journals. This is because authors may publish an empirical research article (reporting a discipline-based study using mixed methods) or a methodological/theoretical article (reporting a contribution to advancing the field of mixed methods research), as I mentioned in Chapter 9. For two major mixed methods journals, the *Journal of Mixed Methods Research* and the *International Journal of Multiple Research Approaches,* the editors have written editorials or opinion pieces about the standards for a high-quality manuscript for their respective journals.

For the *Journal of Mixed Methods Research,* the editors discussed in an editorial a "checklist" of mixed methods elements for a submission to their journal (Fetters & Molina-Azorin, 2019a). They emphasized the importance of any submission contributing to the methodology of mixed methods research (see also their editorial on methodological contributions in articles, Fetters & Molina-Azorin, 2019b). They then advanced a checklist of 20 elements for a submission and organized them in terms of the title, the abstract, and the main text of the article. They also provided specific additional considerations for empirical articles, research articles, and methodological/theoretical articles. Looking closely at their additional considerations for empirical articles, I see several distinct mixed methods features to be included in a good checklist: the procedural diagram; a table, matrix, or visual structure, such as a joint display; integration and interpretation; and stating the how mixed methods advances an understanding beyond the results of quantitative or qualitative data. These are important procedural considerations that I have referred to in earlier chapters in this book.

Turning to the *International Journal of Multiple Research Approaches,* Onwuegbuzie and Poth (2016) issued standards for publications that are recommended in the guidelines for authors submitting to their journal. They analyzed 45 reviewers' comments to 20 manuscripts submitted to a special issue on mixed methods for the *International Journal of Qualitative Methods.* From themes identified in these reviews, they formulated a list of 30 mixed methods quality elements. These elements addressed the warrantedness of the study, its writing quality, its transparency, the use of integration, and the philosophical lens. Most of the 30 elements addressed general research procedures, but in terms of mixed

methods procedures, integration was mentioned as an important category as well as the use of a philosophical lens.

ADVANCING MY QUALITY STANDARDS

I want to conclude by advancing my preferred list of quality standards for mixed methods and my assessment for each element in terms of what would constitute a "high"-quality element and a "low"-quality element. In doing so, I would like to reinforce the major procedures advanced in this book.

To compile my list, I drew on the quality literature I have reviewed as well as the foundation and U.S. federal practices. I further wanted my list to be short and thus manageable for a researcher. I wanted to focus on mixed methods procedures and to stay away from the more general research process quality indicators, as well as elements specific to either quantitative or qualitative research. These are the following indicators for quality in a mixed methods study I have advanced in my workshops. As shown in Table 10.3, my elements of research follow. Perhaps more than other authors, I rely on not only integration but also drawing out metainferences from the integration and discussing how these inferences contribute to the value of using mixed methods research.

TABLE 10.3

A Checklist of My Mixed Methods Standards and "High"- and "Low"-Quality Indicators

Element of Research	Standards Recommended, the Author in the Study	High-Quality Indicators, the Author in the Study	Low-Quality Indicators, the Author in the Study
Abstract	Mentions use of mixed methods	Mentions the specific mixed methods design	Mentions only the use of quantitative and qualitative data
Title	Presents a neutral title devoid of qualitative or quantitative words	Uses wording that conveys the intent of the mixed methods design	Uses wording that only conveys a quantitative or qualitative orientation to the study
Problem	Mentions the need for both quantitative and qualitative data and their integration	Cites evidence that both quantitative and qualitative data are needed	Does not mention the need for mixed methods research

Element of Research	Standards Recommended, the Author in the Study	High-Quality Indicators, the Author in the Study	Low-Quality Indicators, the Author in the Study
Aim (purpose/ questions)	States (1) quantitative, (2) qualitative, and (3) mixed methods purposes/aims/ questions	Relates the mixed methods aim to a specific mixed methods design	Only states quantitative and qualitative aims
Overall design	Identifies the type of mixed methods design used and defines it	Cites literature in the field using the design Includes a diagram of the design	Does not mention the type of mixed methods design used; no diagram is provided
Philosophy and theory	Positions the study within the researcher's worldview and includes a theoretical model	Relates the worldview and theoretical model to the specific mixed methods design	Does not mention the researcher's worldview or use of a theory
Data collection	Discusses the sampling procedure for quantitative, qualitative, and the mixed methods design	Includes a data table summarizing the quantitative and qualitative sources of data	Only discusses the sampling for the quantitative and qualitative data collection
Data analysis	Presents the quantitative, qualitative, and mixed methods data analysis steps	Mentions how integration will be conducted	Includes only quantitative and qualitative data analysis
Results	Presents quantitative results, qualitative findings, and mixed methods integration results	Includes a joint display for mixed methods results	Does not include any discussion of mixed methods integration results

(Continued)

TABLE 10.3 (CONTINUED)

Element of Research	Standards Recommended, the Author in the Study	High-Quality Indicators, the Author in the Study	Low-Quality Indicators, the Author in the Study
Validity	Mentions steps for validity for the quantitative data, the qualitative data, and the mixed methods design	Ties the mixed methods validity discussion to a specific design	Only includes quantitative and qualitative validity
Metainferences	Mentions metainferences drawn from the integration within a design	Describes the process of drawing metainferences from a joint display and relates them to the literature and theories	Does not mention metainferences drawn from integration
Value of mixed methods	States the added value of using mixed methods beyond the quantitative and qualitative results	Relates the added value to metainferences and the content of the study	Does not mention the added value of using mixed methods
Ethical issues	Identifies ethical issues in quantitative, qualitative, and mixed methods design	Specifically mentions the ethical issues related to the design procedures	Only generally mentions the ethics involved in data collection and analysis

RECOMMENDATIONS FROM THIS CHAPTER

This chapter begins by mentioning that researchers can find quality standards for mixed methods research from journals, funding agencies, and criteria set by institutions and faculty. Not all scholars believe that standards are appropriate because they perpetuate the power of individuals creating them, advance an undue structure

around what is acceptable mixed methods research, and have little agreement as to what the standards should be. I support standards and feel that they are widely used by journals and funding agencies, are strongly supported in the health sciences, and assist beginning researchers who often look for guidance on the best practices. The U.S. government and private foundations use standards for funding applications. Specifically, the National Institutes of Health has recommended "best practices" for mixed methods research. It included in its guideline a checklist table that indicates strategies for applications and for reviewers. Other standards are available from research studies conducted with mixed methods researchers, journal publications, and editorial comments from the leading mixed methods journals. From these various sources, I have advanced my recommended list of quality standards, and I provide further comment about "high-quality" and "lower-quality" indicators for each element in a mixed methods study.

ADDITIONAL READINGS

On the topic of whether to have standards, see the arguments in the following:

Collins, K. M. T., Onwuegbuzie, A. J., & Johnson, B. (2012). Securing a place at the table: A review and extension of legitimation criteria for the conduct of mixed research. *American Behavioral Scientist, 56*(6), 849–865.

Fàbregues, S., & Molina-Azorin, J. F. (2016). Addressing quality in mixed methods research: A review and recommendations for a future agenda. *Quality and Quantity.* Advance online publication. DOI: 10.1007/s11135-016-0449-4

On the topic of the "best practices" recommendations from the National Institute of Health, see the following:

Creswell, J. W., Klassen, A. C., Plano Clark, V. L., & Smith, K. C., for the Office of Behavioral and Social Sciences Research. (2011, August). *Best practices for mixed methods research in the health sciences.* Washington, DC: National Institutes of Health. Retrieved from http://obssr.od.nih.gov/mixed_methods_research

NIH, Office of Behavioral and Social Sciences. (2018). *Best practices for mixed methods research in the health sciences* (2nd ed). Bethesda, MD: National Institutes of Health.

On the quality criteria from international mixed methods researchers and from journal articles publishing mixed methods studies, see the following:

Fàbregues, S., & Molina-Azorin, J. F. (2016). Addressing quality in mixed methods research: A review and recommendations for a future agenda. *Quality and Quantity.* Advance online publication. DOI: 10.1007/s11135-016-0449-4

Fàbregues, S., Paré, M. H., & Meneses, J. (2019). Operationalizing and conceptualizing quality in mixed methods research: A multiple case study of the disciplines of education, nursing, psychology, and sociology. *Journal of Mixed Methods Research, 13*(4), 424–445.

Fetters, M. D., & Molina-Azorin, J. F. (2019a). A checklist of mixed methods elements in a submission for advancing the methodology of mixed methods research. *Journal of Mixed Methods Research, 13*(4), 414–423.

Onwuegbuzie, A. J., & Poth, C. (2016, January–February). Editors' afterword: Toward evidence-based guidelines for reviewing mixed methods research manuscripts submitted to journals. *International Journal of Qualitative Methods,* pp. 1–13. DOI: 10.117/1609406916628986

Glossary

Axiology—This philosophical assumption is the researcher's stance on the importance of values in a research study and specifically whether they are made explicit (as in qualitative research) or remain implicit (as in quantitative research).

"Best practices" for mixed methods research in the health sciences—These practices are the recommendations of the National Institutes of Health (NIH), Office of Behavioral and Social Sciences, issued first in 2011 and then updated in 2018. They set forth the best features of mixed methods to be used by those applying for funding from the NIH as well as for reviewers of applications for funding.

Complex mixed methods research designs—These are mixed methods designs in which one or more of the core designs (convergent, explanatory sequential, or exploratory sequential) are embedded within a larger framework or process. In this book, I illustrate this type of design with a mixed methods experimental design, a mixed methods participatory action research design, a mixed methods multiple case study design, and a mixed methods evaluation design.

Convergent design—This is one of the three core designs in mixed methods research. It involves the separate collection of both quantitative and qualitative data, distinct analyses, and the merging of the two databases to compare their results. Typically, researchers attempt to explain or resolve any differences between the two databases.

Core designs in mixed methods research—These are the central designs or procedures used in all mixed methods studies. There are three forms of this design: a convergent design, an explanatory sequential design, and an exploratory sequential design.

Data transformation—Data transformation is when the mixed methods researcher collects qualitative data (e.g., interview data) and then transforms them into quantitative data (e.g., counts of the number of times a code appears in the database). In mixed methods research, the transformed qualitative data (the new quantitative database) are then compared or combined with another quantitative database.

Designs—These are procedures used to conduct mixed methods research. In this book, designs relate to the methods of data collection, data analysis, and metainferences and interpretation, although they also link to other aspects of the project such as the research aims or purpose, the questions, and the worldviews and philosophies.

Diagram—In mixed methods research, investigators often draw diagrams of their mixed methods designs. These diagrams indicate the flow of activities, the specific steps taken in the procedures of data collection, data analysis, and metainferences and interpretation.

Empirical methodological mixed methods research articles *(or original research articles)*—These are research articles that present a study in the author's field and use mixed methods research. They substantially contribute to the researcher's field of inquiry.

Epistemology—This concept is related to the type of evidence used to make claims, including the relationship between the researcher and participants (e.g., impartial and distant or collaborative).

Explanatory sequential design—This core design has the intent of first using quantitative methods and then using qualitative methods to help *explain* the quantitative results in more depth. This is a popular, straightforward design in mixed methods.

Exploratory sequential design—This is one of the three core designs in mixed methods research. It typically involves three phases: In the first phase, the researcher starts with qualitative data collection to explore a topic. The qualitative data are then analyzed, and the results are used in Phase 2 to build a quantitative data collection assessment. This assessment may be the design of a quantitative survey instrument, an experimental intervention procedure, or the development of quantitative variables. This second phase is then followed by a third phase in which the quantitative instrument, intervention, or variables are tested in a quantitative data collection and analysis procedure. This procedure results in a context-specific assessment in the study.

Frameworks or processes in research—In this book, frameworks or processes of research are procedures in research that have distinct steps or stages (e.g., an experiment, a participatory action research study). Into these frameworks or processes, researchers add core designs resulting in complex designs in mixed methods.

Integration—In mixed methods research, integration refers to how one brings together the qualitative and quantitative data in a mixed methods study. The way the researcher combines the data needs to relate to the type of mixed methods design used. Types of integration include merging, explaining, building, and embedding. Integration can be discussed in terms of its intent and its procedure.

Integration intent—This clarification of integration means that there is a reason or justification for collecting and analyzing both quantitative and qualitative data beyond the information obtained from both databases. This intent differs depending on the mixed methods design in a study. The intent may be to compare the two databases (i.e., a convergent design), to explain the quantitative database with qualitative data (i.e., an explanatory sequential design), and to develop culture- and context-sensitive quantitative assessments (i.e., an exploratory sequential design).

Integration procedures—These are the research procedures used to conduct an integration analysis, and they differ by types of design. In a convergent design, the researcher merges the two databases. In an explanatory sequential design, the researcher connects the two databases with the intent of using the qualitative data to explain the quantitative results. In an exploratory sequential design, the procedures involve building a qualitative understanding that is then used to design or modify a quantitative procedure (e.g., a survey) to be context specific. For complex designs, the core designs are embedded within the complex framework or process.

Joint display—This is the procedure, typically used in a convergent design, to merge the quantitative and qualitative data. Joint displays also are developed for other types of mixed methods designs. A joint display is a table or a graph that portrays results from both the quantitative and qualitative data collection (e.g., qualitative themes are arrayed against a quantitative categorical variable, or, given constructs examined in a study, both

qualitative interviews and quantitative survey items are arrayed in columns to reflect results about the constructs).

Metainferences—The researcher closely inspects the results of the integration of the quantitative and qualitative results and draws inferences (or conclusions, interpretations, or insight) from the integration. It is called "metainferences" because inferences are first drawn from the quantitative and qualitative data and then at a "meta" level from the integration of both databases.

Methodology—The process of research stretching from philosophy through interpretation and dissemination.

Methods—The specific procedures of data collection, analysis, and interpretation or metainferences.

Methodological/theoretical articles—These articles advance the knowledge of mixed methods research as a field of study.

Mixed methods integration data analysis—Mixed methods data analysis consists of analyzing the merging or connection between the quantitative and the qualitative databases and drawing metainferences from this analysis.

Mixed methods design—A design encompasses all aspects of the procedures for a mixed methods study, including the philosophy, questions, and data collection, analysis, and interpretation. Within the design, the methods in mixed methods research are the procedures that the researcher uses to collect data, analyze the data, represent the data (e.g., tables, figures), and interpret and draw metainferences from the data.

Mixed methods evaluation designs—This design is a complex design, building on one or more of the core designs. The intent of this design is to conduct a study over time that evaluates the success of a program or activities implemented into a setting. The design involves a longitudinal study of many stages conducted over time with a central objective of the sustained line of inquiry. Core mixed methods designs are embedded within the steps of the evaluation process.

Mixed methods experimental (or intervention) designs—This complex design builds on one or more of the core designs. The intent of this design is to study a problem by conducting an experiment or an intervention trial and adding qualitative data into it. The researcher collects qualitative data before, during, or after an experiment and integrates them through embedding core mixed methods designs during the process of the experiment.

Mixed methods multiple case study designs—This type of complex design includes one or more of the core designs in a study with the intent to develop or test a case or multiple cases, provide evidence for each case, and conduct a cross-case analysis of the cases.

Mixed methods participatory action research designs—This complex design builds on one of the core designs with the intent of studying a problem with an overall social justice or community-based framework (e.g., feminist, critical race theory, community-based participatory research) to improve the lives of individuals and communities in society. The researcher threads this framework throughout the mixed methods study at different points, but it becomes a constant focus of the study. Core mixed methods designs are embedded at different points in the framework.

Mixed methods research—An approach to research in the social, behavioral, and health sciences in which the investigator gathers both quantitative (closed-ended) and qualitative (open-ended) data, integrates the two, and then draws interpretations based on the combined strengths of both sets of data to understand research problems.

Mixed methods research question—In mixed methods research, this is the question being answered by the mixed methods design. The mixed methods question might be, "How do the two databases compare?" (convergent design), "How are the quantitative results explained by the qualitative findings?" (explanatory sequential design), and "How can the exploratory themes (collected on a small group) help to develop a culturally sensitive survey that is tested with a large sample of a population?" (exploratory sequential design).

Mixed methods sampling—The procedures for sampling within a particular design. These include good quantitative sampling, qualitative sampling, and mixed methods sampling that relate to a specific type of core or complex design.

Mixed methods teams—It is popular to form a research team to conduct mixed methods research. This team would include individuals with different methodological orientations, such as quantitative research, qualitative research, and mixed methods research.

Ontology—This concept is the nature of reality (e.g., multiple or singular realities) in a research study.

Pragmatism—This is an American philosophy of research focused on importance of research questions, collecting multiple form of data, looking to the consequences of research, and seeing what works in real-world practice.

Procedures in a diagram—Procedures in mixed methods diagrams are represented by information in the diagram that details activities carried out at each phase of the research. These are often represented by bulleted items, and they show the detail of such features as data collection, data analysis, and interpretation and metainferences.

Products or outcomes in a diagram—These details show the outcomes at each stage of the research and are illustrated using bullets in mixed methods diagrams.

Purposeful (or intentional) sampling—This is the sampling procedure used in the qualitative strand of a mixed methods study. It means that the researcher identifies participants intentionally because they can best help explore the phenomenon being studied in the qualitative strand of the mixed methods study.

Qualitative data—This is the type of data collected in a qualitative study. They are often referred to as "text" data, such as the type of information collected and then transcribed in interviews. They could also be "image" data, such as in the use of photographs or videos. At a broader level, we can consider qualitative data as "open-ended" data, in that the researcher gathers information from participants without specifying response categories for the participant (such as strongly agree to strongly disagree). The typical forms of qualitative data are open-ended interview data; open-ended observation data; documents, such as diaries, letters, or minutes of meetings; and audiovisual materials, such as photographs, videotapes, artifacts, and website information.

Quantitative data—This is the type of data collected in a quantitative study. They are often referred to as "numeric" data or "numbers." At a broader level, these data should be seen as "closed-ended" information, such as the type of information obtained on a survey when

researchers specify the response categories to questions and participants check the correct response. Numeric data can be information reported on instruments, information checked by the researchers as they observe using a checklist, or numbered information available in reports or documents (e.g., census data, attendance data).

Random sampling—An approach to sampling in quantitative research in which the researcher samples participants using a random procedure so that the participants are representative of a population.

Rationale for mixed methods—This is a statement in a mixed methods study that advances the reason for collecting both quantitative and qualitative data and employing a mixed methods design. This statement typically includes a rationale for why both quantitative and qualitative data are needed in a study, what the integration of the two databases will accomplish, and how integration can be obtain using a specific type of mixed methods design.

Research problem—A statement typically presented at the beginning of a project that establishes the issue or concern being addressed in the study.

Rhetorical assumptions—These are the philosophical assumptions that a researcher holds about how a research study should be written, such as whether it should be written from a personal view or more of an objective, detached view.

Sampling in mixed methods research—This set of procedures guides the researcher in selecting participants (and sites) in both quantitative and qualitative strands. The researcher employs particular sampling strategies within each of the mixed methods designs.

Saturation—This is the point in data collection when the researcher has gathered data from several participants, and the collection of data from *new* participants does not add substantially to the codes or themes being developed.

Self-rated assessment of mixed methods skills—This assessment was a scale of skills developed as an intake assessment for entering scholars for the NIH mixed methods training program at Johns Hopkins University.

Standards for Publishing a Mixed Methods Journal Article—A working group commissioned by the American Psychological Association issued standards for mixed methods research reported in the Association's journal articles. This was the first time that the American Psychological Association had advanced specific mixed methods standards in their *Publication Manual.*

Strand—This term refers to the qualitative or quantitative component of the study.

Study aims and purpose statement—These statements set forth the central objective or intent for a study. They are typically included in the introduction to a study, and they represent the most important statement made in a research project.

Template—This is a sentence (or sentences) that I have constructed for the reader or researcher to add in information from their own particular project. For example, I constructed a template for writing a title by asking readers or researchers to insert information about their topic, the participants, the site, and mixed methods.

Theories (or conceptual framework)—These are an overarching explanation as to what the researcher hopes to find in a study. They come from the literature and are often displayed

as figures with boxes that present the process of the explanation. They can provide an explanation for both the quantitative and qualitative strands of a mixed methods project.

Value-added by mixed methods research—After analyzing the integration in a study and drawing metainferences from the integration, the researcher needs to comment on the value-added by mixed methods research in the project. This value can result from the enhanced insight obtained by combining the qualitative and quantitative research that would not be available if only one form of data is used, from the integrative content results from using a mixed methods design or from providing multiple views and standpoints.

Worldview—This term refers to the beliefs and values a researcher brings to a study, and it is typically based on the researcher's past experiences and training. It can be explicitly written or implicitly suggested in a study.

Writing or compositional structure—This structure is the logical structure of organizing and presenting a mixed methods study in a report or a journal article. The structure needs to match the specific mixed methods design used in the project.

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