Additional Resources to Examine

See the following source for a checklist for evaluating a mixed methods study:

This chapter in the *Handbook of Mixed Methods* addresses some of the issues in scholarly writing:

**CHAPTER 9**

**QUESTIONS OFTEN RAISED ABOUT MIXED METHODS RESEARCH**

We have presented the key decisions and major design types that are available to mixed methods researchers. This information represents the building blocks for designing mixed methods studies. Before reading on, take a moment to think about any questions that remain about using a mixed methods research design. Typical questions include the following: What skills are needed to proceed with this design? Will faculty and advisors support this approach? Can different paradigms actually be mixed in a study? Many important questions such as these have been implied in the earlier chapters. In this chapter, we will focus directly on these questions by posing and answering them. We hope that our answers will be of value to readers ranging from beginning graduate students to the most experienced researchers. We have grouped the questions into topics related to definitions, acceptance, and logistics.

This chapter addresses the following issues:

- What is mixed methods research?
- Has this form of research found acceptance?
- Is mixed methods research realistic?
ANTICIPATE MIXED METHODS QUESTIONS

Mixed methods research is an area that is developing and actively being shaped by the researchers who are applying it and writing about it. Because of the emerging nature of this type of research, researchers frequently ask questions about its use. Researchers need to consider answers to these questions so they can design their own studies and be able to defend their projects. A defense may be required before a wide range of audiences, including faculty, proposal reviewers, and journal editors.

Our answers to these questions come from many sources. Some of these issues, such as the mixing of paradigms, have been discussed extensively in the literature. Other sources are from our own research studies and writings. For example, Creswell, Tashakkori, Jensen, and Shapley (2003) surveyed instructors of mixed methods research courses to learn about issues in teaching and conducting mixed methods research. Plano Clark (2005) interviewed 12 mixed methods researchers, representing three different disciplines, about their views toward this form of research. We have also tested materials extensively in our mixed methods classes and in workshops for diverse audiences.

WHAT IS MIXED METHODS RESEARCH?

It is critical that individuals planning or conducting mixed methods research have a core understanding of what it is. This understanding must go beyond knowing the definition we provided in Chapter 1.

It Is Not Just Qualitative Research

Researchers who are new to mixed methods research and to qualitative research may think that mixed methods and qualitative research are the same. However, we view mixed methods research as a methodological approach that is separate and distinct from qualitative research. Quantitative, qualitative, and mixed methods research represent the three main methodological approaches used in the social and behavioral sciences (Tashakkori & Teddlie, 2005a).

This question often arises out of an incomplete understanding of mixed methods research and qualitative research. Mixed methods research involves the collection, analysis, and mixing of both quantitative and qualitative data (see definition provided in Chapter 1). This approach assumes that both types of data will result in a better understanding of the research problem than one data type alone could produce. Qualitative research involves the collection and analysis of an extensive qualitative database. In addition, qualitative research represents distinct designs and strategies for conducting research built on the constructivist assumptions reviewed in Chapter 2.

Qualitative research encompasses a number of specific research traditions, such as the case study (Yin, 2003), narrative inquiry (Clandinin & Connelly, 2000), phenomenology (Moustakas, 1994), grounded theory (Glaser & Strauss, 1967), and ethnography (Van Maanen, 1988). Each of these approaches is best suited for certain types of research questions, and each has its own set of rigorous procedures for data collection, analysis, and validation. The underlying assumptions, research purposes, and specific designs differentiate qualitative research from mixed methods research.

It Is Not Mixed Model Research

Mixed methods and mixed model research—the two names are so similar, even though they represent different research procedures. Mixed model research is the name given to a category of sophisticated, quantitative, statistical techniques that take into account both fixed and random effects during quantitative data analysis and parameter estimation (Cobb, 1998). Therefore, this approach does “mix” models (fixed and random) during analysis, but it does not mix quantitative and qualitative approaches and data, as mixed methods does in our definition in Chapter 1.

It Is Not a Method That Researchers Have Always Used

Many researchers question whether mixed methods research is actually something new or if it represents a traditional approach to research. Without question, research across the social and behavioral sciences has included examples of researchers using both qualitative and quantitative information. However, although these researchers collected both forms of data, they did not usually merge, connect, or embed them. An exception would be the field of evaluation, in which scholars for many years have collected and analyzed both quantitative (product data) and qualitative data (process data). However, they tend to not view this collection and analysis as a distinct design or methodology. Mixed methods as a separate research design is a recent phenomenon. As a separate design, we find distinct design types; names for these types; procedures such as merging, embedding, and connecting; and visual diagrams. Only in the last couple of decades have we seen scholarly works that describe the philosophical foundations of this methodological approach, the
fundamental design types and design decisions, and the language for writing about and evaluating the rigorous nature of this approach.

It is an Approach That Can Be Learned

Several ways exist for learning about mixed methods research. Designing and conducting a study is one way. Others are reading good mixed methods studies, finding methodological literature in which authors discuss the procedures in this form of research, and locating literature syntheses of many mixed methods studies in particular fields.

Published Journal Articles. One of the best ways to learn about conducting and reporting mixed methods studies is to read examples of how other researchers have implemented mixed methods designs in their research. These examples serve as models for how to design mixed methods studies, how to analyze and mix the data, and how to report the details of studies within journal expectations. Although it can be most helpful to examine studies representing one’s own discipline, much can be learned from looking at examples from different disciplines, such as the four studies found in appendixes A, B, C, and D.

To find additional examples, search electronic databases such as the Educational Resources Information Center (ERIC), http://www.eric.ed.gov/, Psychological Abstracts (PsycINFO), http://www.apa.org/psycinfo/, CSA Sociological Abstracts (http://www.csa.com/factsheets/socioabs-set-c.php), or MedLine (accessible through the National Library of Medicine’s PubMed database, http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=). Mixed methods search terms, such as those presented in Chapter 3, can help identify articles that use mixed methods approaches. The abstracts of the identified articles should be reviewed using the checklist in Figure 3.2, to judge whether the study is a mixed methods project.

In this book, we have cited many examples of mixed methods studies that relate to the Triangulation, Embedded, Explanatory, and Exploratory Designs. In reviewing all of these studies, we identified studies we would recommend under each of the four design types, as shown in Figure 9.1. Researchers can consult these articles as good models of mixed methods research and incorporate them as citations in mixed methods proposals and journal articles.

Methodological Literature. Methodological literature includes journal articles, book chapters, or entire books that provide discussions about mixed methods research as a method of research. An extensive list of these articles

<table>
<thead>
<tr>
<th>Mixed Methods Design Type</th>
<th>Example Studies</th>
</tr>
</thead>
</table>

Figure 9.1 Examples of Mixed Methods Studies, by Design Type (Continued)
Table 9.1 (Continued)

<table>
<thead>
<tr>
<th>Mixed Methods Design Type</th>
<th>Example Studies</th>
</tr>
</thead>
</table>

Figure 9.1 Suggested Methodological Readings on Mixed Methods Research


It Has a Philosophical or Worldview Foundation

Researchers also have questions about the philosophical foundations of mixed-methods research. As discussed in Chapter 2, the belief that paradigms or worldviews cannot be mixed is a historical perspective rooted in the early 1980s. This perspective establishes an adversarial relationship between quantitative and qualitative research (Guba & Lincoln, 1988), and Rossman and Wilson (1985) describe it as the "purist" stance. Current writers suggest pragmatism is the overarching paradigm for mixed methods research (see Chapter 2). The pragmatic stance focuses on the research problem and allows multiple methods to address research problems. There is also a line of thinking that suggests that multiple paradigms can be used in a study. This is the "dialectical position" advanced by Greene and Caracelli (1997), who saw value in using multiple paradigms and recommended that researchers be explicit about and honor the paradigm stances in their research.

We agree that researchers should embrace and honor multiple paradigms in their research. In addition, they need to consider how paradigms relate to the different types of mixed methods designs. We see issues of mixing
### Table 9.1

<table>
<thead>
<tr>
<th>Author</th>
<th>Discipline</th>
<th>No. of Reviewed Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greene et al. (1989)</td>
<td>Evaluation</td>
<td>57</td>
</tr>
<tr>
<td>Swann (1992)</td>
<td>Nursing</td>
<td>32</td>
</tr>
<tr>
<td>Creswell et al. (1996)</td>
<td>Postsecondary education</td>
<td>19</td>
</tr>
<tr>
<td>Currali &amp; Tovener (2003)</td>
<td>Management and organizational research</td>
<td>7</td>
</tr>
<tr>
<td>Twinn (2003)</td>
<td>Nursing</td>
<td>80</td>
</tr>
<tr>
<td>Rocco et al. (2003)</td>
<td>Education</td>
<td>17</td>
</tr>
<tr>
<td>Creswell et al. (2004)</td>
<td>Primary care in medicine</td>
<td>5</td>
</tr>
<tr>
<td>Hanson et al. (2005)</td>
<td>Counseling psychology</td>
<td>22</td>
</tr>
<tr>
<td>Plano Clark (2005)</td>
<td>Physics education research, counseling psychology, and primary care in medicine</td>
<td>60 (20 from each discipline)</td>
</tr>
</tbody>
</table>


Several Factors Have Sparked Interest

The interest in mixed methods research across the social and behavioral sciences has grown steadily since the mid-1990s. Chapter 1 summarizes this evidence. In addition, we find that the interest in mixed methods is largely driven by the research questions that are of current interest, quantitative researchers' openness to qualitative data, and the need for research to reach different audiences.

Researchers state that mixed methods research is often the best way to address the complex research questions in which they are currently interested (Plano Clark, 2005). Mixed methods approaches allow a researcher to measure trends, prevalences, and outcomes and at the same time examine meaning, context, and process. Researchers believe that mixed methods strategies can result in enhanced understanding of phenomena and better, more rigorous methodology.

There appears to be openness among many quantitative researchers to the use of qualitative data. For example, in the health sciences, there is an increased interest in using qualitative data in quantitative studies, such as in experimental or causal modeling designs. Illustrations of this interest are found in prestigious journals, in proposals for funding, and in special workshops on qualitative and mixed methods research (see Chapter 1 for these examples).

The attitudes of researchers and the need to reach different audiences have promoted this form of research. For many researchers, mixed methods research just makes sense, and it is analogous to how professionals collect and synthesize information in practice (such as physicians diagnosing patients by taking a history and later reviewing lab results, or educators assessing a student's knowledge through class behavior and exam scores). When they have training in both quantitative and qualitative methods, researchers find it natural to think about combining the two. Mixed methods designs may also improve a study's persuasiveness, because its rhetoric includes both numbers and narrative. This rhetoric can make the research more accessible for practitioners and may help bridge the gap between research and practice.

### IS MIXED METHODS RESEARCH ACCEPTED?

In an emerging methodology such as mixed methods research, this is a fair question. We can assess acceptance by looking to graduate committees, funding agencies, journals, and discipline and international initiatives. Before gauging the level of interest, we can point to several factors leading to the interest in mixed methods research today.

If It Is Rigorous, Graduate Faculty Will Support It

Graduate students often want to know whether their advisor, graduate committee, and other faculty affiliated with their program will support a mixed methods approach. We have found that most faculty members are willing to support a mixed methods approach if the design is rigorous, meaning that it
has, for example, detailed procedures for data collection and analysis, visual diagrams of the procedures, and a strong justification for the use of mixed methods. A graduate student wanting to use mixed methods may thus need to take on the responsibility of educating faculty members about mixed methods research in addition to proposing and completing a study. In such cases, we recommend that the student bring a good mixed methods article to his or her committee meeting and discuss its design and procedures as an example.

In general, we have found two main reasons why faculty may not support a mixed methods approach (Plano Clark, 2005). As mentioned earlier, some faculty researchers are “purists” who believe strongly in the dichotomy of worldviews and of research methods. They have unavailing philosophical reasons for their beliefs that the two methods should not be mixed. Other faculty are not familiar with mixed methods as a rigorous research design. These individuals may have the opinion that mixed methods means throwing together different tactics “willy-nilly,” without a good rationale and without a research design to follow (Plano Clark, 2005, p. 132).

Funding Agencies Support Mixed Methods Research

Considering the amount of effort and resources required to implement a mixed methods approach, questions related to available funding opportunities can be very important. Can mixed methods studies be funded? Are funding agencies—federal or private—willing to support this type of research?

The good news for mixed methods researchers is that the answer appears to be yes. Numerous federal agencies and private foundations have begun to consider studies that not only combine quantitative and qualitative approaches but also call for the use of mixed methods strategies. Federal agencies, such as the National Institutes of Health and the National Science Foundation, as well as various private foundations, such as the Robert Wood Johnson Foundation, have sponsored publications and workshops advocating for and educating researchers about the use of mixed methods research (see discussion and references in Chapter 1).

Although funding agencies appear to be open to mixed methods approaches, it is still not easy to get such projects funded. When designing proposals, researchers must take special care to describe clearly their rationale for using a mixed methods design and all elements of the proposed design. It can be a challenge to describe a proposed mixed methods study in sufficient detail within proposal page limits, and researchers need to make their plan very clear. A visual diagram of the overall plan, as shown in Chapter 3, can be very helpful in condensing and summarizing procedures.

Researchers should examine the list of potential reviewers to see if they have adequate expertise to review a mixed methods proposal. It may be necessary to ask the program officer to include reviewers with this expertise for mixed methods proposals.

Journals Will Publish It

Researchers worry about whether they will be able to publish their mixed methods studies. Mixed methods studies can be and currently are being published in national and international refereed journals. However, it is also true that researchers face challenges when writing up their mixed methods studies and looking for a good match between their studies and available journals.

To start the process, researchers need to identify an appropriate journal for the publication of their study. In some fields, it can be difficult to locate a journal that is open to studies that use a mixed methods approach because the journals publish only quantitative or qualitative studies. In some cases, the journal editors may consider publishing mixed methods studies, but because the reviewers may only know or support one type of method, it is difficult to get an appropriate review. Some journals also have specific guidelines for how to structure the article, which may or may not be a good match with mixed methods designs.

So how does a researcher select a journal for the submission of a mixed methods study? There are two types of journals in which mixed methods studies can be published. First, researchers can consider discipline-specific research journals. Look for journals that have previously published both quantitative and qualitative studies and, preferably, studies that have combined the two. Get to know the interests of the journal editors, and select journals that have editors who are knowledgeable about and supportive of mixed methods research. Consider journals that have a more flexible format, such as online journals or journals that combine online and print features, so that supplemental information can be included in appendices linked to the published study.

A second option for publishing mixed methods studies is in methods-based journals that specialize in mixed methods or qualitative research. Examples of such journals include the Journal of Mixed Methods Research (Sage Publications), Quality and Quantity (Springer), Field Methods (Sage Publications), Qualitative Health Research (Sage Publications), the International Journal of Social Research Methodology (Routledge, Ltd., Publishers), and Methodology: European Journal of Research Methods for
the Behavioral and Social Sciences (Hogrefe and Huber Publishers). These journals accept articles that report research, as well as articles that are extensive discussions of the methods used in research.

Once an appropriate journal has been identified, mixed methods researchers may still find it difficult to report their studies. The biggest challenge related to publishing mixed methods research is describing the complexity of mixed methods studies within the page limits of most journals. This is particularly true in disciplines that traditionally have very tight constraints on article length, such as in the health sciences (where a typical article is limited to only 3000 words). Researchers need to examine the word limits and manuscript structure for the journals if they are to pick one that will be supportive of a mixed methods study. Alternatively, the qualitative and the quantitative arms of a study can be divided and reported separately in different journal articles. In the article, include an overview of the mixed methods design (see sample paragraph in Chapter 4), and describe the procedures concisely and rigorously. The specific guidelines for evaluating a mixed methods study given in Chapter 8 may also help with writing the study.

Acceptance Is Extending to Different Disciplines and Across Cultures

Because mixed methods research is a relatively new approach and has undergone much debate in some disciplines, it may or may not be currently well accepted or well known in all disciplines. In some disciplines, such as evaluation and nursing, it has been discussed and used extensively, but that is not true in many disciplines. However, some journals devoted to disciplines such as counseling psychology and family medicine have published special issues devoted to qualitative or mixed methods research (see Hanson et al., 2005; Creswell et al., 2004).

Based on our work (e.g., Plano Clark, 2005), we have developed a list of criteria that can be used to judge the current level of acceptance of mixed methods research in a specific discipline. This checklist is included in Figure 9.3.

Researchers can use this list to develop a sense of the level of acceptance of mixed methods research in their discipline. If mixed methods research is not well accepted, then this may have implications for how to propose and write about the research. If mixed methods research is not well accepted, then more effort may need to be spent justifying the use of the method and explaining the rationale and research procedures.

Previous work has examined the acceptance of mixed methods in disciplines such as nursing, health sciences, physics education research, counseling psychology, and primary care (Forthofer, 2003; Plano Clark, 2005; Thrinn, 2003). These studies found that the acceptance of mixed methods varies greatly among disciplines and relates to the acceptance of qualitative research within the field, the history and age of the field, and the perceived popularity of the mixed methods approach within that field.

Adding to this information, Plano Clark (2005) identified six benchmarks that signal the acceptance of a new method within a discipline, based on her study of three disciplines. These events include graduate students asking to use the method in their research, disciplinary leaders advocating for the use of the new method, and researchers publishing studies that apply the method. In addition, acceptance of mixed methods is promoted by funding agencies that favor the approach, support of professional organizations through training and dissemination opportunities, and institutionalization of the method within graduate programs and coursework.

Recent events indicate a growing worldwide interest in mixed methods research. A special interest group for mixed methods research was formed in
2005 by the international participants of the American Educational Research Association. In the summer of 2005, the Homerton School of Health Studies in Cambridge, England hosted the first annual "Mixed Methods in Health and Social Care Conference," which was attended by an international community of health, behavioral, and social scientists. During that same summer, an invitational conference on mixed methods was hosted in Basel, Switzerland.

IS MIXED METHODS RESEARCH REALISTIC?

Because of the combination of both quantitative and qualitative approaches and the skills required to conduct both forms of research, mixed methods research is an advanced methodology. Thus, is it realistic for researchers?

Researchers Need Specific Skills

It is realistic if researchers have the skills. We strongly recommend that researchers first gain experience with both quantitative research and qualitative research separately before undertaking a mixed methods study. At a minimum, researchers should be acquainted with the underlying foundations of each type of research and have basic skills at collecting and analyzing quantitative data and qualitative data in a rigorous fashion.

In terms of quantitative research, researchers should be able to pose quantitative, variable-oriented research questions and state quantitative hypotheses using these variables. Researchers should be familiar with common methods of collecting quantitative data, such as using measurement instruments and closed-ended attitudinal scales. Researchers need an awareness of the logic of hypothesis testing and the ability to use and interpret statistical analyses, including common descriptive and inferential procedures available in statistical software packages such as SPSS and SAS. Finally, researchers need to understand essential issues of rigor in quantitative research, including reliability, validity, experimental control, and generalizability.

A similar set of qualitative research skills is necessary. Researchers should be able to identify the central phenomenon of their study; pose qualitative, meaning-oriented research questions; and consider participants as the experts. Researchers should be familiar with common methods of collecting qualitative data, such as semistructured interviews using open-ended questions and qualitative observations. Researchers need basic skills in analyzing qualitative text data, including coding text and developing themes and description based on these codes, and should be acquainted with a qualitative data analysis software package, such as NVivo, Atlas ti, or MAXqda.

Finally, it is important that the researcher understand essential issues of rigor in qualitative research, including credibility, trustworthiness, and common validation strategies.

It Requires Time and Resources

Even when they have the basic quantitative and qualitative research skills, researchers should ask if a mixed methods approach is feasible for their study. This is an important issue to consider early in the planning stage. Mixed methods studies are complex and may require extensive time, resources, and effort on the part of the researcher. The questions researchers should evaluate include the following:

- Is there sufficient time to collect and analyze two different types of data?
- Are there sufficient resources from which to collect and analyze both quantitative and qualitative data?
- Are the skills and personnel necessary to complete this study available?

In answering these questions, researchers must consider how long it will take to gain approval for the study, to gain access to participants, and to complete the data collection and analysis. Researchers should keep in mind that qualitative data collection and analysis often require more time than that needed for quantitative data. The length of time required for a mixed methods study is also dependent on whether the study will be using a one-phase or two-phase design. Researchers need to think about the expenses that will be part of the study. These expenses may include, for example, printing costs for quantitative instruments, recording and transcription costs for qualitative interviews, and the cost of quantitative or qualitative software programs.

Because of the increased demands associated with mixed methods designs, mixed methods researchers should consider working in teams. Teams have the advantage of bringing together individuals with diverse methodological and content expertise as well as simply providing more personnel for conducting the study. Working with a team can be a challenge. It can increase the costs associated with the research. In addition, individuals with the necessary skills need to be located, and team leaders need to create and maintain a successful collaboration among team members. The diversity that can be a strength in a mixed methods research team can also make it difficult to foster effective communication among team members.
If a researcher is working alone, mixed methods can still be a viable option. It can be helpful in this case to use an unequal weighting in the study, with one method having a lesser priority. In addition, lone researchers may find two-phase designs more feasible because they implement only one phase at a time.

**Summary**

Researchers need to anticipate and be able to provide answers to questions about mixed methods research for a wide range of audiences, including faculty, proposal reviewers, and journal editors.

Three questions are often asked. First, what is mixed methods research? This question asks for knowledge beyond the basic definition stated in Chapter 1. Mixed methods research is often confused with qualitative research, although it is a separate approach to research in its own right. It is also not mixed model research, a distinct approach in quantitative analysis.

It is not a type of research with a long history, and mixed methods today includes distinct types of designs, names for these designs, procedures for mixing data, and visual diagrams. It can be learned by reading published journal articles, reviewing methodological articles, and studying literature syntheses of many mixed methods studies in particular fields. Mixed methods is a methodology with a philosophical foundation. Pragmatism is mentioned by authors as one foundation, but multiple worldviews might be used in a mixed methods study.

Second, is mixed methods research accepted? Complex research problems, an openness among quantitative researchers, and the practicality of this form of research have enhanced its acceptance. It is acceptable to graduate faculty if the design is rigorous. It is increasingly being viewed as a legitimate approach by funding agencies, and journals are available that publish such studies and sometimes even specialize in mixed methods research.

Journal articles have been published that report mixed methods studies in the social, behavioral, and health discipline fields and across international groups, signaling acceptance.

Third, is mixed methods realistic? Is it if the researcher has quantitative, qualitative, and mixed methods research skills and if the researcher has time and resources and is willing to make an effort to conduct this rigorous research working alone or with a research team.

**Activities**

1. Write down the questions you had about using mixed methods at the start of this chapter. In your own words, write how you would now answer these questions.

2. Consider what questions your advisor (or another faculty member in your department) might have about using mixed methods. Answer these questions in a way that will be convincing to this individual.

3. What questions will be most important to answer as part of your proposed plan or proposal? Write short paragraphs that will answer these anticipated questions.

4. Locate a mixed methods study in your discipline or field of study. Review the aspects that identify it as a mixed methods project (see Chapter 3). Share it with your colleagues.

**Additional Resources to Examine**

For discussions of the issues identified as important by mixed methods researchers, examine


Chapter 10

Future Directions for Mixed Methods Research

As a methodological movement, mixed methods research is expanding across the social, behavioral, and health sciences. A few researchers may still not accept mixed methods research, but we agree with authors who say that it is time to consider mixed methods as the third methodological movement, alongside quantitative and qualitative research (Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 2003). We believe that in 5 to 10 years, most research in the social, behavioral, and health sciences will incorporate mixed methods strategies either in single studies or across programs of studies. Mixed methods is, simply, best suited for addressing many of today’s complex research questions, which require context and outcomes, meaning and trends, and narratives and numbers.

The field of mixed methods has advanced greatly in recent years, but much exciting work remains, as methodologists and researchers alike push this approach to new levels of development over the next 5 to 10 years. This chapter will focus on ideas that require clarification and emerging developments in the field of mixed methods research, including:

- Mixed methods designs and their corresponding procedural issues
- Mixed methods designs and worldviews

Needed Developments in Mixed Methods Research

We have identified four broad areas in which further work can advance the discussion and application of mixed methods research. These areas include mixed methods designs and associated procedural issues, mixed methods as it relates to different worldviews, applications of mixed methods research, and implications and the value of using mixed methods. Table 10.1 provides an overview of these issues.

Mixed Methods Designs and Associated Procedural Issues

We have identified major mixed methods designs, their variants, and their procedures of application. However, as investigators implement and carefully examine these designs, greater clarification of the challenges will emerge. We need to know more about design-specific issues, such as those related to sampling, data analysis and mixing, and portraying and reporting results. Future studies that discuss these issues will help other researchers anticipate the challenges that will arise with their design choice.

Sampling plays an important role within mixed methods designs (Kemper, Stringfield, & Teddlie, 2003), and it represents an important category of design-specific issues. As discussed in Chapter 6, researchers must make decisions about the relative size of the two samples and whether the two samples include the same participants, whether one sample is a subset of the other, and whether the participants should be completely different for the two samples. These decisions are tied closely to the different design variants. The decisions related to choice of sampling strategies and participant selection criteria are also important and are related to the intent and procedures of the different designs. For example, Gibson-Davis and Duncan (2005) argued that a random sampling strategy was best for selecting participants for the qualitative aspect of their Embedded Experimental study because this would make the quantitative and qualitative data more comparable. Likewise, researchers using sequential approaches can benefit from knowing innovative case selection procedures, to enhance the use of sequential designs. Future research can investigate the implications of these different sampling decisions within the context of specific design variants.
<table>
<thead>
<tr>
<th>Topics</th>
<th>Questions That Need to Be Answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling procedures</td>
<td>• What should the sample sizes be for the quantitative and qualitative arms of a mixed methods study?</td>
</tr>
<tr>
<td></td>
<td>• Should the samples for both arms be of similar sizes?</td>
</tr>
<tr>
<td></td>
<td>• Should random sampling be used for the qualitative data collection, to make the sample comparable to the quantitative sample?</td>
</tr>
<tr>
<td></td>
<td>• When should different types of purposeful sampling be used?</td>
</tr>
<tr>
<td>Procedures for mixing data</td>
<td>• To converge quantitative and qualitative data, what options exist beyond a comparison in the discussion and matrices?</td>
</tr>
<tr>
<td></td>
<td>• What are the possibilities for matrices?</td>
</tr>
<tr>
<td></td>
<td>• How can qualitative data be embedded into a correlational design?</td>
</tr>
<tr>
<td></td>
<td>• How can quantitative data be embedded into an ethnography, grounded theory, or other qualitative design?</td>
</tr>
<tr>
<td></td>
<td>• Are some data transformation procedures more credible (and useful) than others?</td>
</tr>
<tr>
<td></td>
<td>• Are there good examples of transformation of quantitative data into qualitative data?</td>
</tr>
<tr>
<td></td>
<td>• What new innovative designs might be used that have not already been discussed in the literature?</td>
</tr>
<tr>
<td>Software needs</td>
<td>• What are the current features available in software that can assist mixed methods researchers?</td>
</tr>
<tr>
<td></td>
<td>• What new features need to be designed to help implement the mixed methods designs and their variants?</td>
</tr>
<tr>
<td>Writing up mixed methods research</td>
<td>• How do the structures for writing up mixed methods research need to be adapted to fit guidelines for funding proposals?</td>
</tr>
</tbody>
</table>

Researchers will also benefit from further development and refinement of strategies for mixing quantitative and qualitative data. Future directions should include the development of enhanced strategies for mixing quantitative and qualitative results during the conclusion or inferential stage of a study. Questions to be examined include the following: How can researchers do more than just compare and contrast findings? How can results be portrayed using different types of displays to facilitate converging quantitative
Future Directions for Mixed Methods Research

- Subprograms that create different types of comparison matrices for both qualitative and quantitative data (Triangulation Design: convergence model)
- Subprograms to help with data transformation—particularly with converting qualitative data into numbers for comparison with quantitative results (Triangulation Design: data transformation model)—as in the LexiQuest programs of SPSS (http://www.spss.com/predictive_text_analytics/products.htm)
- Subprograms that help in the connection from qualitative results to the design of a questionnaire or other instrument (Exploratory Design: instrument development model)
- Subprograms that identify types of qualitative results useful in selecting cases for further qualitative analysis (Exploratory Design: follow-up explanations model)
- Subprograms that provide a preset coding matrix that relates to the experiences of participants in an experimental trial (Embedded Design: experimental model) (LexiQuest can also help here)

In addition to sampling and mixing issues, mixed methods researchers face the challenge of writing up and publishing their mixed methods studies (Plano Clark, 2005; Szendelowski, 2005). Additional work could examine the structures and conventions used in writing up mixed methods research for different publishing venues. How does the structure differ for writing up mixed methods research for funding agencies and journals? These challenges will continue to evolve and change with time as new publishing formats, such as online journals, journals that combine online and print formats, and online proposal submissions, become more common.

Finally, although we have much to learn about the design variants commonly used at this time, there is also the potential for new, innovative design variants to emerge. Researcher creativity will undoubtedly lead to the development and application of new design variants. Future work can identify and describe these new designs and the procedural issues that accompany their use as they develop and are applied.

Mixed Methods Designs and Different Worldviews

We would like to see more examples of designs that incorporate theoretical perspectives such as feminism, race, gender, disability, and social class. Likewise, postmodern and emancipatory assumptions need further discussion in mixed methods research. We have found only a few published mixed...
methods studies that use these theoretical lenses and assumptions (e.g., Eby, 1995; Watkins, 1998; Bhapal, 2000). Consequently, mixed methods investigators using these perspectives currently have few guidelines on how to incorporate them into their investigations. This holds true as well for historical worldviews, such as pragmatism. If a researcher embraces a pragmatic view, what elements of this perspective go into a written study, and where should they be introduced into the study?

Issues of validity in mixed methods research relate to specific design considerations, as well as to the paradigm underlying the design. How should validity be conceptualized in mixed methods research? What does mixed methods validity look like from a pragmatic viewpoint? How does this viewpoint differ from postpositivist, constructivist, and emancipatory perspectives? What special validity issues are raised by specific types of designs? Mixed methods researchers need a repertoire of strategies for establishing rigor within their mixed methods studies, and these strategies need to reflect both the paradigm guiding the study and the specific design used in the study.

Applications of Mixed Methods Research

There is a growing interest in examining the application of mixed methods research within different disciplinary contexts. Many recent scholarly works have discussed mixed methods research from the perspectives of different disciplines. For example, the Handbook of Mixed Methods in Social and Behavioral Research (Creswell & Teddlie, 2003a) includes seven chapters that discuss disciplinary applications and examples of mixed methods research. These chapters address issues relevant to the disciplines of evaluation (Rallis & Rossman, 2003), management and organizational research (Creswell & Tinnin, 2003), health sciences (Forthofer, 2003), nursing (Chinn, 2003), psychological research (Wang & Sines, 2003), sociology (Hunter & Beyer, 2003), and education (Rocco et al., 2003). Some discussions appearing in the literature have introduced mixed methods research to a specific field and advocated for its use within the disciplinary context. Some discussions have appeared in a range of disciplines, including community and regional planning (Gaber & Gaber, 1997), education policy (Creswell, 1999), sports fan research (Jones, 1997), primary care research (Stange, Miller, Crabtree, O’Connor, & Zyamski, 1994), health services research (Johnstone, 2004), and geriatric health research (Weitzman & Levkoff, 2000). In addition, as noted in Chapter 9 and Table 9.1, many works have specifically reviewed the purposes and procedures of mixed methods research as it is reported in published studies representing specific disciplines. Key features of these disciplinary discussions include working definitions of mixed methods, reviews of relevant literature and historical developments in the discipline, discussions of the assumptions underlying research methodology and mixing methods, and presentations of basic design criteria and procedures.

Despite developments in applying this form of research to such a variety of disciplines, many questions remain unanswered. For example, how is mixed methods being applied in other disciplines not mentioned thus far? To date, mixed methods designs have only been carefully reviewed in a handful of disciplines across the social, behavioral, and health sciences. Many important disciplines, such as family research, political science, and many fields within the health sciences, could benefit from study.

Discipline-based studies on the use of mixed methods can address many important topics. What adaptations need to be made in mixed methods approaches to different disciplines? Most disciplines have unique types of research questions that lead to the development of specific strategies for answering those questions. In regard to mixed methods, adaptation is manifest in the ways the different variations are applied, such as in the differences in the procedures for mixing the two data types. Discipline-based reviews can thus classify and describe new design variants, including procedures specific to these models. In addition, discipline-based discussions can contribute to the awareness and acceptance of mixed methods research within a discipline’s unique context. To date, there has been little systematic work comparing the application of mixed methods across the contexts of different disciplines.

Another interesting area for further study is the acceptance, or status, of mixed methods research within particular disciplines. We know little about the stages of acceptance and how mixed methods research becomes an accepted approach to inquiry in different discipline fields. The findings that formed the basis of the checklist provided in Figure 9.3 can be extended to include more disciplines. Finally, questions about the application of mixed methods research also extend to the emerging area of international studies and the adaptations necessary for other cultures with different perspectives on both quantitative and qualitative research.

Implications and the Value of Using Mixed Methods

Finally, does the use of mixed methods research enhance our understanding of our research problems? Does it add value to our studies—for example, does it add to their contributions to the literature and to practice? Little work has examined this issue to date. O’Cathain, Nicholl, and Murphy (2005) raised the question of what mixed methods studies “yield.” They
Future Directions for Mixed Methods Research

Activities

1. What future direction of mixed methods research do you think is most pressing for your discipline or for your research? Explain why you think this.

2. Do a literature scan for mixed methods studies in your discipline or field of study. Identify to what extent the studies add to and extend our current knowledge of mixed methods research.

3. Consider how your proposed plan or your proposal could address at least one of the future directions identified in this chapter. Write a paragraph in your proposal highlighting how your study can add to the mixed methods field in addition to your content area.

Additional Resources to Examine

For a discussion of recommendations for future research, see:


Summary

These are exciting times in the field of mixed methods research. This method is becoming accepted and well established, but at the same time, future research is needed that will continue to move the field forward. Many areas need further work relate to the different mixed methods designs and their procedural issues. These areas include the challenges and advantages of the designs, sampling, mixing during the data analysis and inference stages, analysis software tools, and report writing. Future work also needs to address mixed methods research using emancipatory perspectives and means for establishing validity within different paradigm perspectives. Profiles of the use of mixed methods within different disciplines will be useful to researchers from those disciplines but will also point out differences and similarities in the use and acceptance of mixed methods within those disciplines. Finally, the value and implications of mixed methods research in regard to how research is tied to practice and policy, how researchers are trained, and how research is funded should be further examined.
Arbor Healthcare System, Center for Practice Management and Outcomes Research in Ann Arbor, Michigan, for providing field "laboratories" within which to test our mixed methods designs.

This is an exciting time in the evolution of the field that has become mixed methods research. We hope that this book is a useful tool for more researchers to use in learning about this approach to research and in conducting their own mixed methods studies.

CHAPTER 1

UNDERSTANDING MIXED METHODS RESEARCH

Work on this book began almost a decade ago when we started writing about mixed methods research at the time that qualitative research had achieved legitimacy and writers were advocating for its use in the social and human sciences. Since then, we have published more than a dozen articles and book chapters on mixed methods research. However, our own articles, as well as articles written by others, are difficult to find because they are scattered in many journals and books. This is why it is difficult to see the emerging threads of this new approach.

We say that mixed methods is a new approach, but we recognize that others may not see it as a recent approach. Researchers for many years have collected both quantitative and qualitative data in the same studies. However, to put both forms of data together as a distinct research design or methodology is new. Thus the idea of mixing the data, the specific types of research designs, the notation system, the terminology, the diagrams of procedures, and the challenges and issues in using different designs—all topics found in this book—are new features that have emerged within the last decade. Indeed, we have new mixed methods research designs that stand alongside experiments, surveys, ethnographies, case studies, and the many designs available to the researcher in the social and human sciences.
This first chapter addresses

- A framework for viewing mixed methods research
- A definition of mixed methods research, and
- The importance of this approach, historically and today

**PURPOSE AND ORGANIZATION**

Because mixed methods is a new design, researchers need an introduction to the approach, guidance as to how to conduct the design, and information about the specific procedures involved. The purpose of this book is to provide researchers with

- an introduction to mixed methods research
- the process involved in designing and conducting this form of inquiry, and
- within this process, a focus on four types of mixed methods designs

Two key elements form the central features of this book: the phases in the process of mixed methods research and four specific mixed methods designs. The process phases advanced in this book build on the preliminary steps that we provided several years ago (Creswell, 1999; Creswell, Goodchild, & Turner, 1996). We have now refined these steps, based on our experiences with mixed methods research through classes, workshops, and our own mixed methods studies. We recognize that reducing research to phases in the process of research runs the risk of oversimplifying the procedure, suggesting an unwavering, linear approach to research. However, we view the process not as a series of lock-step procedures but as a general framework that might be useful to beginning researchers as well as those already conducting and reviewing mixed methods research. One might proceed to use the phases in a different order than we present them—use them in a way that makes sense for a specific research problem.

The additional focus on four key mixed methods designs also builds on our earlier work (Creswell, 2003; Creswell, Plano Clark, Guimann, & Hanson, 2003). As we have worked with these different approaches to mixed methods research, we have found that the choice of a type of design to use suggests the procedures for collecting and analyzing data and even for writing titles and purpose statements in research.

We present a visual model of the logic of our process approach in Figure 1.1. As shown in Figure 1.1, we divide the phases in the process into individual chapters in this book.

![Figure 1.1 Framework Used in This Book for Designing and Conducting Mixed Methods Research](image_url)
Designing and Conducting Mixed Methods Research

What Is Mixed Methods Research?

Some mixed methods writers consider this form of research a methodology and focus on the philosophical assumptions (e.g., Tashakkori & Teddlie, 1998). To call it a methodology introduces a complexity (some would say a needed complexity) to the process of research. Unquestionably, all research approaches have underlying philosophical assumptions that guide the inquirer. Mixed methods research assumes a worldview or several worldviews, a position that we will advance in more detail in Chapter 2.

Other mixed methods writers emphasize the techniques or methods of collecting and analyzing data (e.g., Creswell, Plano Clark, et al., 2003; Greene, Caracelli, & Graham, 1989; Onwuegbuzie & Teddlie, 2005). To call mixed methods research a “method” is clear and concise and resonates with many researchers (Elliot, 2005). In this book, we will refer to it as a research design with philosophical assumptions as well as quantitative and qualitative methods. This middle ground seems to provide the broadest definition possible, but it is a definition with a clear focus. Undoubtedly, as a consensus grows as to the meaning of mixed methods research, the definition will evolve. For the purposes of this book, we will define it as follows:

**Mixed methods research** is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of quantitative and qualitative approaches in many phases of the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central promise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone.

Using this definition as our guide, we will now more closely inspect major elements of this definition.

The Name

Let’s start with the name of the approach. There has been much discussion about the name. During the last 50 years, writers have used different names, making it difficult to locate articles that might relate to mixed methods research. It has been called “multivariate/multimethod research” (Campbell & Fiske, 1959), which recognizes the collection of several quantitative...
methods in a single investigation; "integrated" or "combined," in the sense that two forms of data are blended together (Seckler, McLeroy, Goodman, Bird, & McCormick, 1992); and "quantitative and qualitative methods" (Fielding & Fielding, 1986), which acknowledges that the approach is actually a combination of methods. It has been called "hybrids" (Ragin, Nagel, & White, 2004); "methodological triangulation" (Morse, 1991), which recognizes the convergence of quantitative and qualitative data, "combined research" (Creswell, 1994); and "mixed methodology," which acknowledges that it is both a method and a philosophical worldview (Tsabikiori & Teddlie, 1998).

Today, the most frequently used name is "mixed methods research," a name associated with the recent Handbook of Mixed Methods in Social and Behavioral Research (Tsabikiori & Teddlie, 2003a). Although the term mixed methods may not be familiar to a large number of social, behavioral, and human science scholars, its frequent use will encourage researchers to see this approach as a distinct methodology and method, used by an increasingly larger scholarly community.

Quantitative and Qualitative Data

According to our definition, mixed methods research involves both collecting and analyzing quantitative and qualitative data. Quantitative data includes closed-ended information such as that found on attitude, behavior, or performance instruments. The collection of this kind of data might also involve using a closed-ended checklist, on which the researcher checks the behaviors seen. Sometimes quantitative information is found in documents such as census records or attendance records. The analysis consists of statistically analyzing scores collected on instruments, checklists, or public documents to answer research questions or to test hypotheses.

In contrast, qualitative data consists of open-ended information that the researcher gathers through interviews with participants. The general, open-ended questions asked during these interviews allow the participants to supply answers in their own words. Also, qualitative data may be collected by observing participants or sites of research, gathering documents from a private (e.g., diary) or public (e.g., minutes of meetings) source, or collecting audiovisual materials such as videotapes or artifacts. The analysis of the qualitative data (words or text or images) typically follows the path of aggregating the words or images into categories of information and presenting the diversity of ideas gathered during data collection.

The open-versus closed-ended nature of the data differentiates between the two types better than the sources of the data. The sources of the data do not clearly map onto qualitative and quantitative research, at least as much as they used to. For example, surveys, a traditional quantitative source of data, are being used in ethnographic qualitative research (see LeCompte & Schensul, 1999), and narrative stories, associated with qualitative research, are being linked to quantitative event history modeling (Elliot, 2005). More will be said in Chapter 2 about the major characteristics of quantitative and qualitative research.

Mixing the Data

The mixing of data is a unique aspect of our definition. By mixing the datasets, the researcher provides a better understanding of the problem than if either dataset had been used alone. As we will discuss in Chapter 4, there are three ways in which mixing occurs: merging or converging the two datasets by actually bringing them together, connecting the two datasets by having one build on the other, or embedding one dataset within the other so that one type of data provides a supportive role for the other dataset. Figure 1.2 presents a diagram that visually depicts these differences. In short, it is not enough to simply collect and analyze quantitative and qualitative data; they need to be "mixed" in some way so that together they form a more complete picture of the problem than they do when standing alone.

![Figure 1.2: Three Ways of Mixing Quantitative and Qualitative Data](image-url)
Single or Multiple Studies

The definition also suggests that mixed methods studies may involve collecting and analyzing qualitative and quantitative data within a single study or within multiple studies in a program of inquiry. These differences are displayed in Figure 1.3. In large, funded projects, researchers may collect quantitative data in the first phase, followed by qualitative data in the second phase, followed by quantitative data in the third phase. Each project is reported separately as a distinct study, but, overall, the program of inquiry can be called mixed methods research. We have found this to be the case in many large-scale health science projects (e.g., Baskerville, Hogg, & Lemelin, 2001). On the other hand, graduate students typically collect both quantitative and qualitative data in a single study rather than in multiple studies over time. Our focus in this book will be primarily on the single study rather than the multiple studies over time, but the ideas can certainly apply to both forms of inquiry.

The Central Premise of the Definition

The basic premise of the definition is that the combination of quantitative and qualitative approaches provides a better understanding of research problems than either approach alone. In what way is it better? Stated differently, what is the value that mixed methods research adds that qualitative or quantitative approaches, each by themselves, do not provide? The case can be made on several grounds.

- Mixed methods research provides strengths that offset the weaknesses of both quantitative and qualitative research. This has been the historical argument for mixed methods research for the last 25 years (Jick, 1979). The argument goes that quantitative research is weak in understanding the context or setting in which people talk. Also, the voices of participants are not directly heard in quantitative research. Further, quantitative researchers are in the background, and their own personal biases and interpretations are seldom discussed. Qualitative research makes up for these weaknesses. On the other hand, qualitative research is seen as deficient because of the personal interpretations made by the researcher, the ensuing bias created by this, and the difficulty in generalizing findings to a large group because of the limited number of participants studied. Quantitative research, it is argued, does not have these weaknesses. Chapter 2 explores in more detail the elements of both quantitative and qualitative research, but, clearly, the combination of both approaches can offset the weaknesses of either approach used by itself.

- Mixed methods research provides more comprehensive evidence for studying a research problem than either quantitative or qualitative research alone. Researchers are given permission to use all of the tools of data collection available rather than being restricted to the types of data collection typically associated with qualitative research or quantitative research.

- Mixed methods research helps answer questions that cannot be answered by qualitative or quantitative approaches alone. For example, “Do participant views from interviews and from standardized instruments converge or depart?” is a mixed methods question. Others would be, “What explains the quantitative results of a study?” (using qualitative data to explain the quantitative results) and “Will a treatment work with a particular sample in an experiment?” (exploring qualitatively before an experiment begins). To answer these questions, quantitative or qualitative approaches would not provide a satisfactory answer. The array of possibilities of mixed methods questions will be explored further in Chapter 5.

- Mixed methods encourages researchers to collaborate across the sometimes adversarial relationship between quantitative and qualitative researchers. We are social, behavioral, and human sciences researchers first,
and dividing between quantitative and qualitative only serves to narrow the approaches and collaboration to inquiry:

- Mixed methods research encourages the use of multiple worldviews or paradigms rather than the typical association of certain paradigms for quantitative researchers and others for qualitative researchers. It also encourages us to think about a paradigm that might encompass all of quantitative and qualitative research, such as pragmatism, or using multiple paradigms in research, as discussed further in Chapter 2.

- Mixed methods research is "practical" in the sense that the researcher is free to use all methods possible to address a research problem. It is also "practical" because individuals tend to solve problems using both numbers and words, they combine inductive and deductive thinking, and they (e.g., therapists) employ skills in observing people as well as recording behavior. It is natural, then, for individuals to employ mixed methods research as the preferred mode of understanding the world. When people talk about the Katrina devastation in the southern United States, both words and numbers come to mind. This type of talk is not only more natural, it is also more persuasive than either words or numbers by themselves in presenting a complete picture of the devastation.

Despite its value, conducting mixed methods research is not easy. It takes time and resources to collect and analyze both quantitative and qualitative data. It complicates the procedures of research and requires clear presentation if the reader is going to be able to sort out the different procedures. Further, investigators are often trained in only one form of inquiry (quantitative or qualitative), and mixed methods requires that they know both forms of data. These issues are important, and we return to them in Chapter 9, but they are not insurmountable, and strategies can be used to address them. The value of mixed methods research seems to outweigh the potential difficulty of this approach.

Studies That Fit Our Definition

Having analyzed our definition, we now turn to examples of studies that closely fit our definition (we examine the types of designs in Chapter 4). In each scenario that follows, the researchers collected and analyzed both quantitative and qualitative data, mixed the data, and reported the studies as a single mixed methods study.

- A researcher collects data on quantitative instruments and in qualitative focus groups to see if the two types of data show similar results but from different perspectives (see Black & Ricasio’s 1994 study of African-American adolescent boys or Flanagan, McGrath, Meyer, & Garcia Coll’s 1995 study of teenage mothers’ transitions to motherhood).

- A researcher conducts an experiment in which quantitative measures assess the impact of a treatment on outcomes. Before the experiment, the researcher collects qualitative data to help design the treatment or, alternatively, to better recruit participants for the trial (see the study of physical activity and diet for families in one community by Brett, Heimendinger, Boender, Morin, & Marshall, 2002, or the study of recruitment of patients with prostate cancer for a trial by Donovan et al., 2002).

- A researcher collects data using a quantitative survey instrument and follows up with interviews with a few individuals who participated in the survey to learn more detail about their survey responses (see the study of depression and substance use of students in high schools by Way, Staub, Nakula, & London, 1994, or the attitudes of adoptive fathers toward birthfathers by Baumann, 1999).

- A researcher explores how individuals describe a topic by starting with interviews and then uses an analysis of the information to develop a survey instrument that is administered later to a sample from a population (see the study of lifestyle behaviors of Japanese college women by Tashiro, 2002, and the study of women’s social constructions of gender identity at work by Ely, 1995).

- A researcher mixes quantitative and qualitative approaches to research throughout a study. Both qualitative and quantitative questions are posed, both forms of data collected and analyzed, and a quantitative and qualitative interpretation is made. In reading the sections of the study, the reader finds a mixing of both approaches threaded throughout the study (see Goergolin & Swartz’s 1992 study of non-science college students’ attitudes toward science).

Studies in the Gray Areas

Those types of mixed methods studies that might conform to part of our definition, but not all of it, we call the “gray areas.” We have collected some examples that fall into this category.

- A study employing minimum qualitative research. Consider a survey study that includes a few open-ended questions as part of the survey. The researcher analyzes the qualitative responses to validate the quantitative findings. Is this a mixed methods study? The qualitative data may consist of short sentences and brief comments, hardly the type of qualitative data that involves rich context and detailed information from participants (Morse & Richards, 2002). Although it may not include a rich collection of qualitative
data, it does meet the minimum criteria spelled out in our definition. Therefore, we consider it an example of mixed methods research.

- **A content analysis study.** Consider a study in which only one type of data is collected but both types of data analysis are used. For example, a researcher would collect only qualitative data but would analyze the data both qualitatively (developing themes) and quantitatively (counting words or rating responses on predetermined scales). A more typical content analysis study would be one in which the researcher collects only qualitative data and transforms it into quantitative data by counting the number of codes or themes. Are either of these examples mixed methods research? Certainly they use “mixed methods data analyses” (Onwuegbuzie & Teddlie, 2005) consisting of both qualitative and quantitative data analysis, but the data collection procedure involves collecting only qualitative data (and not quantitative data). Under a “methods” definition in our definition, the study would not be mixed methods because both qualitative and quantitative data are not being collected. Under a “methodological” definition—combining at any stage in the process of research—the study would be considered mixed methods because both qualitative and quantitative data analysis is going on. The more open methodological stance woul consider it mixed methods.

- **Multimethod research** (Morse, 2005). Consider a study in which the researcher collects, analyzes, and mixes multiple forms of either qualitative or quantitative data. For example, a researcher could collect multiple forms of qualitative data, such as community documents for a participatory action research study and interviews during grounded theory research. A researcher could collect, analyze, and mix different types of quantitative data (e.g., quantitative surveys with structured observations). Are these examples of mixed methods research? This type of research is generally referred to as mixed-method research instead of mixed methods research, because it is based on multiple qualitative or quantitative methods and data sets.

- **Mixed worldviews.** Assume that a researcher uses both a worldview associated with qualitative research, such as social constructivism (see Chapter 2), in which the meaning of lived experiences is explored for the participants, and a worldview associated with quantitative research, such as positivism. Also assume that the methods of data collection consist of standardized instruments. Here, multiple worldviews are employed that are typically associated with both qualitative and quantitative research, but the actual data collection consists of quantitative data. Is this a mixed methods study? From a methodological perspective, it is mixed methods because worldviews associated with both qualitative and quantitative research are used, even though both forms of data are not collected.

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**The Importance of Mixed Methods Research**

A number of factors have contributed to the evolution of mixed methods research. The complexity of our research problems calls for answers beyond simple numbers in a quantitative sense or words in a qualitative sense. A combination of both forms of data can provide the most complete analysis of problems. Researchers can situate numbers in the contexts and words of participants, and they can frame the words of participants with numbers, trends, and statistical results. Both forms of data are necessary today. In addition, qualitative research has evolved to a point where writers consider it a legitimate form of inquiry in the social and human sciences (see Denzin & Lincoln, 2005). Quantitative researchers, we believe, recognize that qualitative data can play an important role in quantitative research. Qualitative researchers, in turn, realize that reporting only qualitative participant views of a few individuals may not permit generalizing the findings to many individuals. Audiences such as policy makers, practitioners, and others in applied areas need multiple forms of evidence to document and inform the research problems. A call for increased sophistication of evidence leads to a collection of both quantitative and qualitative data.

In recent years, many authors have begun to advocate for mixed methods research as a separate methodology or design. Tashakkori and Teddlie (2000a) called mixed methods research the “third methodological movement” (p. 98). This means that in the evolution of research methodologies, mixed methods now follows quantitative approaches and then qualitative approaches as the third movement. Unquestionably, many scholars are interested in mixed methods research as it has evolved during the last few decades.

**A Brief History**

Our approach to mixed methods research has grown out of the work of others as well as the historical and philosophical discussions of the last several decades. We turn now to a brief history. For those designing and conducting mixed methods studies, a historical overview helps in defending this design to faculty and editors, highlights lingering debates and issues, and provides a philosophical foundation for using this design. A sketch of the history of mixed methods research can be found in Tashakkori and Teddlie (1998). Here we will review this history and organize it into four, often overlapping, time periods (see Table 1.1).

**Formative Period.** The formative period began in the 1950s and continued up until the 1980s. This period saw the initial interest in using more than one
## Table 1.1 Selected Writers Important in the Development of Mixed Methods Research and Their Contributions

<table>
<thead>
<tr>
<th>Stage of Development</th>
<th>Authors (Year)</th>
<th>Contribution to Mixed Methods Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formative period</td>
<td>Campbell and Fiske (1959)</td>
<td>Introduced the use of multiple quantitative methods</td>
</tr>
<tr>
<td></td>
<td>Sieber (1973)</td>
<td>Combined surveys and interviews</td>
</tr>
<tr>
<td></td>
<td>Jick (1979)</td>
<td>Discussed triangulating qualitative and quantitative data</td>
</tr>
<tr>
<td></td>
<td>Cook and Reichardt (1979)</td>
<td>Presented 10 ways to combine quantitative and qualitative data</td>
</tr>
<tr>
<td>Paradigm debate period</td>
<td>Rossman and Wilson (1985)</td>
<td>Discussed sanctions toward combining methods—purists, situationalists, and pragmatists</td>
</tr>
<tr>
<td></td>
<td>Bryman (1988)</td>
<td>Reviewed the debate and established connections within the two traditions</td>
</tr>
<tr>
<td></td>
<td>Reichardt and Rallis (1994)</td>
<td>Discussed the paradigm debate and reconciled two traditions</td>
</tr>
<tr>
<td></td>
<td>Greene and Caracelli (1997)</td>
<td>Suggested that we move past the paradigm debate</td>
</tr>
<tr>
<td>Procedural development period</td>
<td>Greene, Caracelli, and Graham (1989)</td>
<td>Identified a classification system of types of mixed methods designs</td>
</tr>
<tr>
<td></td>
<td>Brewer and Hunter (1989)</td>
<td>Focused on the multimethod approach as used in the process of research</td>
</tr>
<tr>
<td></td>
<td>Morse (1991)</td>
<td>Developed a notation system</td>
</tr>
<tr>
<td></td>
<td>Creswell (1994)</td>
<td>Identified three types of mixed methods designs</td>
</tr>
<tr>
<td></td>
<td>Morgan (1998)</td>
<td>Developed a typology for determining design to use</td>
</tr>
<tr>
<td></td>
<td>Newman and Benz (1998)</td>
<td>Provided an overview of procedures</td>
</tr>
<tr>
<td></td>
<td>Tashakkori and Teddlie (1998)</td>
<td>Presented topical overview of mixed methods research</td>
</tr>
<tr>
<td></td>
<td>Bamberger (2000)</td>
<td>Provided an international policy focus to mixed methods research</td>
</tr>
<tr>
<td>Advocacy as separate design period</td>
<td>Tashakkori and Teddlie (2003a)</td>
<td>Provided a comprehensive treatment of many aspects of mixed methods research</td>
</tr>
<tr>
<td></td>
<td>Creswell (2003)</td>
<td>Compared quantitative, qualitative, and mixed methods approaches in the process of research</td>
</tr>
<tr>
<td></td>
<td>Johnson and Owuor (2004)</td>
<td>Positioned mixed methods research as a natural complement to traditional qualitative and quantitative research</td>
</tr>
</tbody>
</table>

Method in a study. It found momentum in the 1950s when Campbell and Fiske (1959) advocated for the collection of multiple forms of quantitative data to study the validation of psychological traits. They developed the multitrait, multimethod matrix, which was designed to attribute individual variation in personality scale scores to the trait itself rather than to the method used to measure it. Others combined both quantitative and qualitative data in this period (Sieber, 1973; Jick, 1979), and the question became whether it was possible to combine both forms of data when they arose from different perspectives (see Cook & Reichardt, 1979).

**Paradigm Debate Period.** During the 1970s and 1980s, qualitative researchers were adamant that different assumptions provided the foundations for quantitative and qualitative research (see Guba & Lincoln, 1988; Smith, 1983). Basically, the paradigm debate was whether or not qualitative and quantitative data could be combined. Some argued that mixed methods research was unenlumin (or incommensurable or incompatible) because mixed methods asked for paradigms to be combined (Smith, 1983). In 1988, Bryman challenged the argument and began suggesting that a clear connection existed between the two traditions. By 1994, Reichardt and Rallis noted how this debate played out with vocal advocates on both sides at the American Evaluation Association annual meeting. Today, there are still qualitative researchers who eschew mixed methods research because of the incompatibility of “mixing” paradigms. Rossman and Wilson (1985) called these individuals purists, who could not mix paradigms; others, they called situationalists, who adapt their methods to the situation, and pragmatists, who believe that multiple paradigms can be used to address research problems. Although the issue of reconciling paradigms is still apparent (see Chapter 10), calls have been made to embrace pragmatism as the best philosophical foundation for mixed methods research (see Tashakkori & Teddlie, 2003a, and Chapter 2) and to use different paradigms in mixed methods research but to honor each and be explicit about when each is used (Greene & Caracelli, 1997).

**Procedural Developments.** Although the debate about which paradigms provide a foundation for mixed methods research is still ongoing, attention during the 1980s began to shift toward the methods or procedures for designing a mixed methods study. In 1989, three individuals in the field of evaluation—Greene, Caracelli, and Graham—authored a classic article that laid the groundwork for mixed methods research design. In their article, they analyzed 57 evaluation studies, developed a classification system of six types, and talked about the design decisions that go into each of the types. Following in the footsteps of this article, many authors have identified classification systems (see Chapter 4 for a review of many classifications).
roughly the same time, two sociologists, Brewer and Hunter (1989), contributed to the discussion by linking multimethod research to the steps in the process of research (e.g., formulating problems, sampling, and collecting data). By 1991, Morse, a nursing researcher, designed a notation system to convey how the quantitative and qualitative components of a study are implemented (see Chapter 4 for our use of these notations to diagram the procedures in published studies).

Building on these classifications and notations, writers began discussing specific types of mixed methods designs. For example, Creswell (1994) created a parsimonious set of three types of designs and found studies that illustrated each type. Morgan (1998) provided a decision matrix for determining the type of design to use, and books such as those of Newman and Benz (1998) and Tashakkori and Teddlie (1998) began to map the contours of mixed methods procedures, paying special attention to such issues as validity and inferences.

Recent Indicators of Interest. The turn of the millenium has seen a growth in the interest in mixed methods research as well as authors advocating for mixed methods research as a separate design in its own right (Tashakkori & Teddlie, 2003a; Creswell, 2003). The 768-page *Handbook of Mixed Methods in Social and Behavioral Research* (Tashakkori & Teddlie, 2003a) emerged with 26 chapters devoted to controversies, methodological issues, applications in different discipline fields, and future directions. In addition, Creswell (2005) aligned mixed methods as a third approach alongside quantitative and qualitative approaches. Most recently, Johnson and Onwuegbuzie (2004) advocated for considering mixed methods as a legitimate design in educational research.

Additional developments highlight the increased interest in mixed methods research today:

- In 1999, the National Institutes of Health's (NIH) Office of Behavioral and Social Sciences Research published guidelines for qualitative and mixed methods research and included models for combining qualitative and quantitative approaches.
- In 2003, the National Science Foundation (NSF) held a workshop on the scientific foundations of qualitative research, with five papers devoted to combining qualitative and quantitative methods (Ragin, Nagel, & White, 2004).
- In the summer of 2004, NIH held a workshop titled Design and Conduct of Qualitative and Mixed-Method Research in Social Work and Other Health Professions, sponsored by seven NIH Institutes and two research offices. Among the topics discussed was the use of mixed methods research in intervention research.
- The National Research Council (2002) discussed scientific research in education and concluded that three questions need to guide inquiries: "Description—What is happening? Cause—Is there a systematic effect? And the process or mechanism—Why or how is it happening?" (p. 99). These questions, in combination, suggest both a quantitative and a qualitative approach to scientific inquiry.
- Private foundations have recently held workshops for their scholars on mixed methods research, such as the Robert Wood Johnson Foundation and the W. T. Grant Foundation.
- The number of mixed methods studies reported in journal articles continues to increase. We found more than 60 articles in the social and human sciences that employed mixed methods research between 1995 and 2005 (Plano Clark, 2005).
- A Special Interest Group on Mixed Methods Research has formed in the American Educational Research Association. Its initial meeting was held in April 2005 in Montreal, Canada.
- Mixed methods research is being applied in more and more disciplines and fields of study. For example, the *Annals of Family Medicine* published a special issue on mixed methods research (e.g., see Creswell, Fetter, & Ivanova, 2004). The *Journal of Counseling Psychology* also published a special issue on qualitative and mixed methods research (e.g., see Hanson, Creswell, Plano Clark, Pergola, & Creswell, 2005). Calls for increased use of qualitative data in traditional experimental trials in the health sciences have been reported in prestigious journals such as the *Journal of the American Medical Association* (Flory & Emanuel, 2004) and *Lancet* (Maltocci, 2001).
- Cross-disciplinary reviews of mixed methods research are available in Greene et al. (1989), Creswell et al. (1996), and Plano Clark (2005).
- In the fall of 2005, Sage Publications started a new journal called the *Journal of Mixed Methods Research*. This journal, exclusively devoted to publishing mixed methods studies and discussions about the methodology of mixed methods research, is edited by John W. Creswell and Abbas Tashakkori, with Vicki L. Plano Clark as the managing editor. The first issue will be available in January 2007. The journal's call for papers states that "the definition of mixed methods research is research in which the investigator collects, analyzes, mixes, and draws inferences from both quantitative and qualitative data in a single study or a program of inquiry" (*Journal of Mixed Methods Research*, 2006).
Mixed methods research is of interest to international audiences as well. The first international conference specifically devoted to mixed methods research was held in July, 2005, at Cambridge University. Sponsored by theHomerton School of Health Studies, it brought together more than 100 mixed methods investigators and methodologists. During August 2005, an invitational mixed methods conference was held in Basel, Switzerland.

Thus, today, we see cross-cultural international interest, interdisciplinary interest, publication possibilities, and public and private funding opportunities for mixed methods research.

Summary

In this book, we will examine the research phases in designing and conducting mixed methods research. Mixed methods research is a research design with a methodology and methods. As a methodology, it involves collecting, analyzing, and mixing qualitative and quantitative approaches at many phases in the research process, from the initial philosophical assumptions to the drawing of conclusions. As a method, it focuses on collecting, analyzing, and mixing quantitative and qualitative data in a single study or series of studies. It is premised on the idea that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone. This better understanding results because mixed methods offer strengths that offset the weaknesses of separately applied quantitative and qualitative research methods. It also encourages the collection of more comprehensive evidence for study problems, helps answer questions that quantitative or qualitative methods alone cannot answer, and reduces adversarial relationships among researchers and promotes collaboration. Mixed methods encourages the use of multiple worldviews and is a practical and natural approach to research. Mixed methods research is important today because of the complexity of problems that need to be addressed, the rise of interest in qualitative research, and the practical need to gather multiple forms of data for diverse audiences. It has evolved through four phases: a formative phase, the paradigm debate, the procedural period, and the emerging recent interest exemplified in public and federal funding, journals, disciplines, and special workshops.

Activities

1. In your own words, write a definition of mixed methods research and discuss the value of using this design as opposed to others in your research.

2. Consider the value of mixed methods research for different audiences, such as policy makers, graduate advisors, individuals in jobs or the workplace, and graduate students. Discuss the value for each audience.

3. Select a mixed methods study in your field of study. Using the definition in this chapter, discuss whether the article addresses the components of the definition.

4. Discuss the importance of each of the four phases in the historical development of mixed methods research and how each contributes to the value of this design today.

Additional Resources to Examine

For a definition of mixed methods research, consult:


For a historical analysis of mixed methods research, see:


For steps in the process of conducting a mixed methods study, see:


CHAPTER 2

EXAMINING PRELIMINARY CONSIDERATIONS

Before designing and conducting a mixed methods study, consider several factors. Recognize the philosophical assumptions that provide a foundation for research. Some reviewers and graduate committee members may require researchers to be specific about the worldview that provides the foundation for their studies. All studies include assumptions about the world and knowledge that informs the inquiries. Also, have a good understanding of the basics of both quantitative and qualitative research. Recognize that they have common elements but differ in the implementation of these elements. Finally, determine whether mixed methods is a suitable design to use in addressing the research problem in a study. What types of problems are best suited for mixed methods research? This chapter will review the types of problems that require a mixed methods approach.

This chapter will address:

- The worldview or paradigm stances that relate to mixed methods research
- The elements of quantitative and qualitative research that provide a foundation for collecting and analyzing both forms of data in a mixed methods study
- The types of research problems best addressed by mixed methods research

We all bring to our research worldviews or paradigms that influence how we design and conduct our projects. Worldview and paradigm mean how we view the world and, thus, go about conducting research. They contain a basic set of beliefs or assumptions that guide our inquiries (Guba & Lincoln, 2005). They are a philosophy deeply rooted in our personal experiences, our culture, and our history. They may change during our lives and be shaped by new experiences and new thoughts.

Different Worldviews or Paradigms

Why are these worldviews important? (We will use worldview primarily to discuss these assumptions, because many definitions exist for paradigm.) All research needs a foundation for its inquiry, and inquirers need to be aware of the implicit worldviews they bring to their studies. This awareness is especially important for graduate students who need to be able to identify and articulate the worldviews that they bring to research. An explicit statement of worldviews often does not find its way into journal publications, but it is a topic frequently raised at conference presentations and a topic in need of discussion when a new methodology is developed, such as mixed methods research.

Some researchers make their worldviews explicit by discussing them in their research; others recognize their presence but do not actively discuss them in their research. When asked about their philosophical assumptions by reviewers (e.g., committee members) or participants at a conference, these researchers can clearly articulate their beliefs. Still others are not familiar with the philosophical foundations of the different methods of conducting research and may not realize that behind each study lies assumptions the researcher makes about reality, how knowledge is obtained, and the methods of gaining knowledge. Especially for those in this last category, it will be helpful to review the different worldviews available. For those conducting mixed methods research, it is important to stop and reflect at this time on the worldviews available that may inform and provide legitimacy for mixed methods inquiry.

What worldviews exist? What are the common philosophical elements of all worldviews? The various worldviews continue to evolve, and there is no set standard for what they might be. Researchers tend to categorize the different types of worldviews and to describe characteristics that they all have in common (see, for example, Slife & Williams, 1995; Lincoln & Guba, 2000):
have this association, however. The need to improve our society and those in it characterizes these views. Issues such as empowerment, marginalization, hegemony, patriarchy, and other issues affecting marginalized groups need to be addressed, and researchers collaborate with individuals experiencing these injustices. In the end, the advocacy-participatory researcher plans for the social world to be changed for the better, so that individuals will feel less marginalized. A final worldview, pragmatism, is typically associated with mixed methods research. The focus is on the consequences of research, on the primary importance of the question asked rather than the methods, and multiple methods of data collection inform the problems under study. Thus it is pluralistic and oriented toward “what works” and practice.

All four worldviews have common elements but take different stances on these elements. They represent different views on the nature of reality (ontology), how we gain knowledge of what we know (epistemology), the role values play in research (axiology), the process of research (methodology), and the language of research (rhetoric) (Lincoln & Guba, 2000; Creswell, 2003). These different stances influence how researchers conduct and report their inquiries. Examples of these common elements, the different worldviews, and how the elements and worldviews are translated into practice are shown in Table 2.2.

As an example, consider the methodological differences. In postpositivist research, the investigator works from the “top” down, from a theory to hypotheses to data, to add to or contradict the theory. In constructivist approaches, the inquirer works from the “bottom” up, using the participants’ views to build broader themes and generate a theory interconnecting the themes. In advocacy and participatory research, the methodology is collaborative, with the participants serving as active members of the research team, helping to form questions, analyze the data, and implement the results in practice. In pragmatism, the approach may combine deductive and inductive thinking, as the researcher mixes both qualitative and quantitative data.

In addition to examining the common elements that comprise the different worldviews, we need to see how these worldviews work in the process of research. A helpful conceptualization is available in Crotty (1998). As shown in Table 2.3, worldview assumptions known as epistemology are the broadest, most philosophical stances in the research process. These assumptions also exist at the next level of theoretical perspective, such as in symbolic interactionism, critical inquiry, and feminism. At this level, the researcher narrows the worldview to a particular theoretical lens. Moving to the next column in Table 2.3, we see methodology, which involves the various types of approaches to research that we have been calling designs, such as experiments, survey research, and grounded theory research. In this column, we

<table>
<thead>
<tr>
<th>Postpositivism</th>
<th>Constructivism</th>
<th>Advocacy and Participatory</th>
<th>Pragmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination</td>
<td>Understanding</td>
<td>Political</td>
<td>Consequences of actions</td>
</tr>
<tr>
<td>Reductionism</td>
<td>Multiple</td>
<td>Empowerment and issue</td>
<td>Problem</td>
</tr>
<tr>
<td>Empirical</td>
<td>participant</td>
<td>oriented</td>
<td>centered</td>
</tr>
<tr>
<td>observation</td>
<td>meanings</td>
<td>Collaborative</td>
<td></td>
</tr>
<tr>
<td>measurement</td>
<td>Social and</td>
<td>Change oriented</td>
<td>Pluralistic</td>
</tr>
<tr>
<td>Theory</td>
<td>historical</td>
<td></td>
<td>Real-world</td>
</tr>
<tr>
<td>verification</td>
<td>construction</td>
<td></td>
<td>practice</td>
</tr>
<tr>
<td>Theory generation</td>
<td></td>
<td></td>
<td>oriented</td>
</tr>
</tbody>
</table>

### Table 2.2: Common Elements of Worldviews and Implications for Practice

<table>
<thead>
<tr>
<th>Worldview Element</th>
<th>Postpositivism</th>
<th>Constructivism</th>
<th>Advocacy and Participatory</th>
<th>Pragmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontology</strong> (What is the nature of reality?)</td>
<td>Singular reality (e.g., researchers reject or fail to reject hypotheses)</td>
<td>Multiple realities (e.g., researchers provide quotes to illustrate different perspectives)</td>
<td>Political reality (e.g., findings are negotiated with participants)</td>
<td>Singular and multiple realities (e.g., researchers test hypotheses and provide multiple perspectives)</td>
</tr>
<tr>
<td><strong>Epistemology</strong> (What is the relationship between the researcher and that being researched?)</td>
<td>Distance and impartiality (e.g., researchers objectively collect data on instruments)</td>
<td>Closeness (e.g., researchers visit participants at their sites to collect data)</td>
<td>Collaboration (e.g., researchers actively involve participants as collaborators)</td>
<td>Practicality (e.g., researchers collect data by &quot;what works&quot; to address research question)</td>
</tr>
<tr>
<td><strong>Axiology</strong> (What is the role of values?)</td>
<td>Unbiased (e.g., researchers use checks to eliminate bias)</td>
<td>Biased (e.g., researchers actively talk about their biases and interpretations)</td>
<td>Biased and negotiated (e.g., researchers negotiate with participants about interpretations)</td>
<td>Multiple stances (e.g., researchers include both biased and unbiased perspectives)</td>
</tr>
<tr>
<td><strong>Methodology</strong> (What is the process of research?)</td>
<td>Deductive (e.g., researchers test an a priori theory)</td>
<td>Inductive (e.g., researchers start with participants' views and build &quot;up&quot; to patterns, theories, and generalizations)</td>
<td>Participatory (e.g., researchers involve participants in all stages of the research and engage in cyclical reviews of results)</td>
<td>Combining (e.g., researchers collect both quantitative and qualitative data and mix them)</td>
</tr>
<tr>
<td><strong>Rhetoric</strong> (What is the language of research?)</td>
<td>Formal style (e.g., researchers use agreed-on definitions of variables)</td>
<td>Informal style (e.g., researchers write in a literary, informal style)</td>
<td>Advocacy and change (e.g., researchers use language that will help bring about change and advocate for participants)</td>
<td>Formal or informal (e.g., researchers may employ both formal and informal styles of writing)</td>
</tr>
</tbody>
</table>

### Table 2.3: The Four Elements Basic to Any Research Process

<table>
<thead>
<tr>
<th>Epistemology</th>
<th>Theoretical Perspective</th>
<th>Methodology</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectivism</strong></td>
<td>Positivism and postpositivism</td>
<td>Experimental research</td>
<td>Sampling</td>
</tr>
</tbody>
</table>
| **Constructivism** | Interpretivism  
- Symbolic interactionism  
- Phenomenology  
- Hermeneutics | Survey research | Measurement and scaling |
| **Subjectivism** (and its variants) | Critical inquiry | Ethnography | Questionnaires |
| | Feminism | Phenomenological research | Observation  
  - Participant  
  - Nonparticipant |
| | Postmodernism, etc. | Grounded theory | Interview  
  - Focus group  
  - Case study  
  - Life history  
  - Narrative |
| | | Heuristic inquiry | Visual ethnographic methods  
  - Statistical analysis  
  - Data reduction  
  - Theme identification  
  - Comparative analysis  
  - Cognitive mapping  
  - Interpretative methods  
  - Document analysis  
  - Content analysis  
  - Conversation analysis, etc. |

would update Crotty’s list and add “mixed methods research.” It is a methodology with epistemological and theoretical perspectives as well as methods. In the final column on the right, we see methods, the specific techniques of data collection and analysis (e.g., questionnaires, visual ethnographic methods). For mixed methods research, in which the investigator collects both qualitative and quantitative data, the methods involve multiple forms of data collection and analysis.

Worldviews and Mixed Methods Research

How does a worldview provide a foundation for mixed methods research? Answers to this question have occupied the attention of mixed methods researchers for some time (Tashakkori & Teddlie, 1998, 2003a). In designing and conducting mixed methods research, researchers need to know the alternative stances on worldviews and mixed methods research and to be able to articulate the stances they are using. They might convey their stances in a separate section of a project, titled “philosophical assumptions,” or in the methods section of their plan or study. Three stances are discussed in the mixed methods literature.

Stance 1: There is one “best” paradigm or worldview that fits mixed methods research. Although some individuals still seek to participate in the paradigm debate, many mixed methods writers have moved on to identify the “best” paradigm that provides a foundation for mixed methods research. Tashakkori and Teddlie (2003a) suggest that at least 13 different authors embrace pragmatism as the worldview or paradigm for mixed methods research. Although we have already introduced pragmatism, because of its importance, it merits further discussion.

Pragmatism is a set of ideas articulated by many people, from historical figures, such as Dewey, James, and Pierce, to contemporaries, such as Cherrybom (1992), Murphy (1990), and Rorty (1990). It draws on many ideas, including employing “what works,” using diverse approaches, and valuing both objective and subjective knowledge. Recently, Tashakkori and Teddlie (2003a) formally linked pragmatism and mixed methods research, arguing that

1. Both quantitative and qualitative research methods may be used in a single study.
2. The research question should be of primary importance—more important than either the method or the philosophical worldview that underlies the method.

3. The forced-choice dichotomy between postpositivism and constructivism should be abandoned.
4. The use of metaphysical concepts such as “truth” and “reality” should also be abandoned.
5. A practical and applied research philosophy should guide methodological choices.

It is worth pointing out, however, that Tashakkori and Teddlie (2003a) also mention one other possible “best” philosophical basis of mixed methods research, the transformative-emancipatory paradigm, another term for the advocacy-participatory approach. This paradigm focuses on the experiences of individuals who suffer from discrimination or oppression and involves engaging in research that addresses power differentials (Mertens, 2003). It necessitates the understanding of multiple contexts, building trust between researchers and research participants, and developing meaningful ways of addressing the concerns of diverse groups.

Stance 2: Researchers can use multiple paradigms or worldviews in their mixed methods study. This position states that multiple paradigms may be used in mixed methods research; researchers must simply be explicit in their use. This “dialectical” perspective (Greene & Caracelli, 1997, 2003) recognizes that different paradigms give rise to contradictory ideas and contested arguments—features of research that are to be honored but cannot be reconciled. These contradictions, tensions, and oppositions reflect different ways of knowing about and valuing the social world. This stance emphasizes using multiple paradigms (e.g., constructivism and advocacy) during the study instead of using one overall paradigm, such as pragmatism.

Stance 3: Worldviews relate to the type of mixed methods design and may vary depending on the type of design. Creswell et al. (2005) advocate for honoring different paradigm perspectives in application. They identify six different mixed methods designs and discuss how philosophical paradigms may differ, depending on the type of design used. This perspective maintains that investigators may view mixed methods research strictly as a “method” (as discussed in Chapter 1), thus allowing researchers to employ any number of philosophical foundations for its justification and use. The idea of relating different worldviews to different mixed methods designs will be revisited in Chapter 9.

In summary, as a general philosophical position for mixed methods research, then, pragmatism seems best to us, but as we will indicate later, our worldview informs the type of research design we employ. We recommend
that researchers consider the three stances on the question of worldviews, determine which stance(s) fit their worldview, and then present a written discussion in the mixed methods plan or study that reflects the stance(s) they have chosen.

THE BASICS OF QUANTITATIVE AND QUALITATIVE RESEARCH

Another preliminary consideration before designing and conducting mixed methods research is to review and know the basic elements of both quantitative and qualitative research (see Table 2.4), because both of these forms of research are used in mixed method studies. One learns about these approaches from taking coursework in quantitative and qualitative methods, by reading published studies, and by participating in actual research projects. Also, because diverse approaches to qualitative research exist, ranging from different philosophical assumptions to postmodern perspectives to various procedural approaches, the basics of qualitative research especially need to be reviewed. In this discussion, we will highlight the major elements of qualitative research as discussed by authors such as Morse and Richards (2002), Rossman and Rallis (1998), and Maxwell (1996).

A review of qualitative and quantitative research starts with the knowledge that they both address the same elements in the process of research. In Table 2.4, the center column indicates the major steps in the process of research. The qualitative and quantitative approaches then differ in how researchers implement each step. These differences are not opposites; rather, we see them as differences on a continuum. Thus, when viewing the headings of the columns on the left and right, one sees that the elements tend in the direction of one approach or the other. No single study perfectly fits all of the elements of either a qualitative or quantitative study. In good, scholarly studies that we would classify as either qualitative or quantitative, many of the elements can be easily seen.

As shown in Table 2.4, the two approaches tend to differ in the basic intent of the research—what the researcher hopes to accomplish during a study. This intent is typically expressed in the form of a purpose statement or the guiding objectives of the study. In qualitative research, the intent is to learn participants’ views about a particular phenomenon. On the other hand, in quantitative research, the intent is to see how data provided by participants fits an existing theory (i.e., model, framework, or explanation). Thus the intent in quantitative research is either to support or to refute an existing theory.

### Table 2.4 Elements of Qualitative and Quantitative Research in the Process of Research

<table>
<thead>
<tr>
<th>Elements of Qualitative Research Tend Toward . . .</th>
<th>Process of Research</th>
<th>Elements of Quantitative Research Tend Toward . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Understand meaning individuals give to a phenomenon inductively</td>
<td>Intent of the research</td>
<td>• Test a theory deductively to support or refute it</td>
</tr>
<tr>
<td>• Minor role</td>
<td>How literature is used</td>
<td>• Major role</td>
</tr>
<tr>
<td>• Justifies problem</td>
<td>How intent is focused</td>
<td>• Justifies problem</td>
</tr>
<tr>
<td>• Ask open-ended questions</td>
<td>How data are collected</td>
<td>• Identifies questions and hypotheses</td>
</tr>
<tr>
<td>• Understand the complexity of a single idea (or phenomenon)</td>
<td>How data are analyzed</td>
<td>• Ask closed-ended questions</td>
</tr>
<tr>
<td>• Words and images</td>
<td>Role of the researcher</td>
<td>• Test specific variables that form hypotheses or questions</td>
</tr>
<tr>
<td>• From a few participants at a few research sites</td>
<td></td>
<td>• Numbers</td>
</tr>
<tr>
<td>• Studying participants at their location</td>
<td></td>
<td>• From many participants at many research sites</td>
</tr>
<tr>
<td>• Text or image analysis</td>
<td></td>
<td>• Sending or administering instruments to participants</td>
</tr>
<tr>
<td>• Themes</td>
<td></td>
<td>• Numerical statistical analysis</td>
</tr>
<tr>
<td>• Larger patterns or generalizations</td>
<td></td>
<td>• Rejecting hypotheses or determining effect sizes</td>
</tr>
<tr>
<td>• Identifies personal stance</td>
<td></td>
<td>• Remains in background</td>
</tr>
<tr>
<td>• Reports bias</td>
<td></td>
<td>• Takes steps to remove bias</td>
</tr>
<tr>
<td>• Using validity procedures that rely on the participants, the researcher, or the reader</td>
<td>How data are validated</td>
<td>• Using validity procedures based on external standards, such as judges, past research, statistics</td>
</tr>
</tbody>
</table>

A review of the literature is included in the research, and it may serve several purposes. In qualitative research, the researcher reviews the literature and uses it to provide evidence for the purpose of the study and the underlying problem addressed by the inquiry. The literature review is sometimes brief, and it does not guide the development of the research questions asked. In this way, the review of the literature in a qualitative study does not limit or constrain the types of information the researcher will learn from the participants in a study. In a quantitative study, the literature review establishes the importance of the purpose and the research problem in a study, and it has an additional goal. The literature may be used to identify a theory.
to test or the specific questions that remain unanswered in the literature and that must be asked of the participants. Quantitative literature reviews, because of the multiple roles they assume, are often longer and more detailed than qualitative literature reviews.

The broad intent of a study and the literature help to narrow the research questions or hypotheses (see also Chapter 5 on this point). In qualitative research, because the intent is to learn from the participants, the questions are open-ended, allowing the participants to provide the information from their perspective. Participants' responses are likely to differ, so the understanding developed from these open-ended questions will lead to many diverse, complex answers. To obtain these perspectives, the qualitative researcher typically focuses on a single concept or phenomenon and learns about this phenomenon in depth. In quantitative research, the intent and literature point toward focused, closed-ended questions that relate variables to each other. The researcher seeks to find answers as a means of testing theories. Theories are composed of hypotheses or relational statements, and these statements are made up of variables. The researcher tests these hypotheses (or research questions) to support or refute the relationship statements in the theories.

Addressing the questions or hypotheses requires that the researcher collect data (see Chapter 6 for a more detailed discussion of the process). In qualitative research, the data tend to be words from participants (e.g., transcripts from interviews or field notes from observations). They may also be images, in the form of photographs or videotapes. To develop a deep understanding of the phenomenon, the researcher collects extensive data from only a few individuals, because more individuals participating in a study means that the researcher will obtain less depth from each participant. Further, that depth can be better established by actually going to the research site (e.g., home, place of work of the participants) to learn about the context of participants' thinking. In contrast, quantitative research tends to report only numbers or scores obtained from instruments, checklists, or information available in accessible documents (e.g., census reports). The idea is to test the theories broadly to see how they apply to many people at many sites. Thus instruments are sent to or collected from a large number of individuals, typically individuals representative of some larger population.

Analyzing the data follows data collection and relates to the forms of data collected (see Chapter 7 for a more detailed discussion of the steps). In qualitative research, the text or word data are analyzed using increasing levels of abstraction. From coding text segments, the researcher forms themes and may interrelate the themes to form broad generalizations. In quantitative research, the scores lead to numeric analysis through statistical procedures.

The overall intent is to reject or fail to reject the hypotheses to establish the theory. Researchers also may assess the differences in the impact of treatments in experiments through effect sizes.

The role of the researcher differs in qualitative and quantitative approaches. In qualitative research, the inquirers are "up front" and identify how their experiences and backgrounds shape the interpretations they make through the coding and theme development process. They report their own biases and position themselves in the research. In quantitative research, the investigator remains largely in the background. Specific steps are taken to reduce the bias in the study, such as enacting procedures to reduce the threats to internal validity that might render the results useless or presenting instruments to participants that contain words that are unbiased and not likely to lead to certain answers.

Establishing validity is an important step in the process of research, regardless of whether the research is qualitative or quantitative. However, the strategies used differ considerably. In qualitative research, the inquirer is interested in the accuracy of the final report or account. To this end, the themes may be taken back to participants (this is called member-checking), or the researcher may use multiple sources of information to provide evidence for a theme. The researcher spends considerable time in the field, thus contributing to the accuracy of an account, or employs a peer or external auditor to review all phases of the study. The focus in qualitative validity is reliance on the participants to review the findings, the resources of the researcher, or external reviewers.

In quantitative research, validity does not reside with the participants as much as with the accumulated evidence that supports the intended interpretation of test scores for a proposed purpose (Standards for educational, 1999). This evidence is based on test content, theoretical and empirical analyses of the response processes of test takers, an analysis of the internal structure of a test, the relation of test scores to variables external to the test, and the intended and unintended consequences of test use.

RESEARCH PROBLEMS ADDRESSED BY MIXED METHODS

Beyond identifying a worldview stance and reviewing the basics of qualitative and quantitative research, an additional consideration prior to designing and conducting a mixed methods study is whether mixed methods, as compared to other designs, best addresses the research problem. What type of research problems are well suited for mixed methods research?

Before addressing mixed methods, let's begin by considering the types of problems addressed by quantitative and qualitative designs. Unfortunately,
Table 2.5  Types of Research Problems and Matching Methods or Designs

<table>
<thead>
<tr>
<th>Type of Research Problem</th>
<th>Types of Methods (Designs)</th>
<th>Suited to Studying the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need to see if a treatment is effective</td>
<td>Experimental design</td>
<td></td>
</tr>
<tr>
<td>Need to see what factors influence an outcome</td>
<td>Correlation design</td>
<td></td>
</tr>
<tr>
<td>Need to identify broad trends in a population</td>
<td>Survey design</td>
<td></td>
</tr>
<tr>
<td>Need to describe a culture-sharing group</td>
<td>Ethnography design</td>
<td></td>
</tr>
<tr>
<td>Need to generate a theory of a process</td>
<td>Grounded theory design</td>
<td></td>
</tr>
<tr>
<td>Need to tell the story of an individual</td>
<td>Narrative research</td>
<td></td>
</tr>
</tbody>
</table>

Although research method writers often proclaim that "the methods should match the problem," they seldom explain what they mean. Examine Table 2.5. As shown in this table, the relationship between research problems, in the left column, and the corresponding designs, in the right column, may make sense. If, for example, an investigator has a research problem (or questions) that requires examining whether a treatment is effective, he or she will use experimental procedures. If a need exists to describe the language or rituals of a culture-sharing group, an ethnography will be employed. Table 2.5 is not meant to be exhaustive but illustrative of some possible designs. What sorts of research problems would be the best match for mixed methods research?

Some answers are available in the mixed methods literature, but writers organize them under topics such as the “purpose” for mixed methods research (e.g., Greene, Caracelli, & Graham, 1989), or the “rationale” or “reasons” for using mixed methods research (see Creswell, 2003). Such discussions do not clearly convey the types of problems that best fit mixed methods research. Here are situations in which mixed methods is the preferred approach to addressing the research problem.

A Need Exists for Both Quantitative and Qualitative Approaches

When only one approach to research (quantitative or qualitative) is inadequate by itself to address the research problem, mixed methods research is the preferred design. The combination of qualitative and quantitative data provides a more complete picture by noting trends and generalizations as well as in-depth knowledge of participants’ perspectives. Situations in which this might occur are when a potential exists that one form of evidence (qualitative or quantitative) might contradict the other form of evidence (quantitative or qualitative). One type of evidence may not tell the complete story, or the researcher may lack confidence in the ability of one type of evidence to address the problem. Further, the type of evidence gathered from one level in an organization might differ from evidence looked at from other levels. These are all situations in which using only one approach to address the research problem would be deficient. A mixed methods design best fits this problem. For example, when Black and Ricardo (1994) studied drug use and trafficking and weapon carrying among low-income African American adolescent boys, they collected both survey data and interview data. At the end of the introduction to their study, they provided the reasons for collecting both forms of data: “By using a combination of qualitative and quantitative data gathering techniques, investigators can clarify subtleties, cross-validate findings, and inform efforts to plan, implement, and evaluate intervention strategies” (p. 1066).

A Need Exists to Enhance the Study With a Second Source of Data

When a quantitative design (e.g., experiment or correlational study) can be enhanced by qualitative data, or when a qualitative design (e.g., grounded theory or case study) can be enhanced by quantitative data, a mixed methods design is the preferred design. A problem might exist that results from an experimental or correlational design being insufficient in itself, in this situation, qualitative data enhances the overall study. Situations in which this occurs are the incorporation of embedded qualitative data in an experiment and the use of qualitative data to help explain the mechanisms actually at work in a correlational design. Although the use of quantitative data to enhance a qualitative study is less common, quantitative data might enhance a description of results or the identification of salient themes. Using an experiment as an example, Donovan et al. (2002) conducted an experimental trial comparing two groups of men with prostate cancer using different treatment procedures. They began their study however, with a qualitative component in which they interviewed the men to determine how best to recruit them into the trial (e.g., how best to organize and present the information), because all the men had received abnormal results and sought the best treatment.
Toward the end of the article, the authors reflected on the value of this preliminary, smaller, qualitative component used to recruit individuals to the trial:

We showed that the integration of qualitative research methods allowed us to understand the recruitment process and elucidate the changes necessary to the content and delivery of information to maximize recruitment and ensure effective and efficient conduct of the trial. (p. 768)

A Need Exists to Explain the Quantitative Results

A problem exists when the quantitative results are inadequate to provide explanations of outcomes, and the problem can best be understood by using qualitative data to enrich and explain the quantitative results in the words of participants. Situations in which this problem occurs are those in which the quantitative results need further interpretation as to what they mean or when more detailed views of select participants can help to explain the quantitative results. A mixed methods design is thus the preferred design. Wampold et al. (1995) conducted a two-phase study of social communication and interaction skills. The first phase was of undergraduates in college classes, who completed two quantitative instruments. The second, qualitative phase sought to understand social interactions in an actual work context, and this second phase involved chemistry work groups. The authors reported,

First, because the nature and tasks of work groups differ significantly across work settings, differences in the nature and tasks of the groups would be confounded with differences in the social skill levels of the group members, precluding traditional group comparisons. Second, we wanted to describe the social interactions in their natural setting. (p. 371)

A Need Exists to First Explore Qualitatively

A problem exists when qualitative research can provide an adequate exploration of a problem, but such an exploration is not enough—quantitative research is needed to further understand the problem. The situations in which this occurs are when qualitative research can explore initially to best identify variables, constructs, taxonomies, and theories to test, as well as aid in the identification of items and scales to help develop a quantitative instrument. Mixed methods research provides a good method for these types of problems. For example, Kutzer, Steiner, Corbett, Jahning, and Barton (1999) studied issues important to terminally ill patients. Their study began with qualitative interviews, and these were then used to develop an instrument that was administered to a second sample of terminally ill patients. The authors said: “The use of initial open-ended interviews to explore the important issues allowed us to formulate relevant questions and discover what were truly concerns to this population” (p. 1590).

In these examples, the authors provided only one reason for their use of mixed methods research. Multiple reasons might actually exist, and we recommend that investigators first ask themselves what all the reasons are for using mixed methods research and then specifically state these reasons clearly in their study.

Summary

Before designing and conducting a mixed methods study, three preliminary considerations need attention. Researchers need to consider what worldview or philosophical assumptions underlie their mixed methods study. Three stances are (a) that there is a “best” worldview to use with mixed methods research, (b) that researchers can employ multiple worldviews and honor each, and (c) that the worldview and the type of mixed methods design are closely related. Next, the researcher should review the basics of quantitative and qualitative research, as both will be included in the mixed methods study and because many approaches exist to qualitative research. Quantitative and qualitative research approaches tend to differ in the major steps they use in the process of research, such as the intent of the study, the review of the literature, the use of questions or hypotheses, the data collection, the data analysis, the role of the researchers, and the validation of the data. Finally, consider whether the research problem requires a mixed methods approach. Addressing the research problem may require both quantitative and qualitative approaches, may require adding a secondary form of data to a design, may require explaining quantitative results with qualitative data, or may require initially exploring qualitatively before developing a quantitative study.

Activities

1. Identify your worldview or paradigm stance for your mixed methods study. Why did you take this position?

2. Find one quantitative and one qualitative research article. Go through each article and list the major elements of both approaches, using Table 2.4 as your guide.
3. State the reasons why you are using mixed methods research to address your research problem. Why would one form of data not provide enough information to address your research problem or questions?

4. Reflect on the picture of the birthday cake shown in Figure 2.1. What do you see going on in this cake? Write a paragraph about the cake, using the major elements of both qualitative and quantitative research. Then write a paragraph identifying what is gained by bringing the qualitative and quantitative perspectives together into one perspective.

**Additional Resources to Examine**

persistence. In the second phase, she used a qualitative multiple case study approach to help explain why certain factors identified in the first phase were significant predictors of student persistence in the program.

The participant selection model (Figure 4.3c) is used when a researcher needs quantitative information to identify and purposefully select participants for a follow-up, in-depth, qualitative study. In this model, the emphasis of the study is usually on the second, qualitative phase. For example, May and Etikan (2002) collected quantitative data to identify physics students with consistently high and low conceptual learning gains. They then completed an in-depth qualitative comparison study of these students’ perceptions of learning.

**Strengths of the Explanatory Design.** The Explanatory Design is considered the most straightforward of the mixed methods designs. The advantages of this design include the following:

- Its two-phase structure makes it straightforward to implement, because the researcher conducts the two methods in separate phases and collects only one type of data at a time. This means that single researchers can conduct this design; a research team is not required to carry out the design.
- The final report can be written in two phases, making it straightforward to write and providing a clear delineation for readers.
- This design lends itself to multiphase investigations, as well as single mixed methods studies.
- This design appeals to quantitative researchers, because it often begins with a strong quantitative orientation.

**Challenges in Using the Explanatory Design.** Although the Explanatory Design is straightforward, researchers choosing this approach still face challenges specific to this design.

For all variants:

- This design requires a lengthy amount of time for implementing the two phases. Researchers should recognize that the qualitative phase (depending on the emphasis) will take more time than the quantitative phase, but that the qualitative phase can be limited to a few participants. Still, adequate time must be budgeted for the qualitative phase.
- The researcher must decide whether to use the same individuals for both phases, to use individuals from the same sample for both phases, or to draw participants from the same population for the two phases.

Chapter 6 explores approaches to using individuals from the same sample or population in this approach.

- It can be difficult to secure internal review board approval for this design because the researcher cannot specify how participants will be selected for the second phase until the initial findings are obtained. Approaches to addressing this issue by tentatively framing the second, qualitative phase for the internal review board are discussed in Chapter 6.

For the follow-up explanations model:

- The researcher must decide which quantitative results need to be further explained. Although this cannot be determined precisely until after the quantitative phase is complete, options, such as selecting significant results and strong predictors, can be discussed and weighed as the study is being planned, as discussed further in Chapter 6.

For the participant selection model:

- Investigators need to specify criteria for the selection of participants for the qualitative phase of the research. Options include the use of demographic characteristics, groups used in comparisons during the quantitative phase, and individuals who vary on select predictors.

**The Exploratory Design**

As with the Explanatory Design, the intent of the two-phase Exploratory Design (see Figure 4.4a) is that the results of the first method (qualitative) can help develop or inform the second method (quantitative) (Greene et al., 1989). This design is based on the premise that an exploration is needed for one of several reasons: Measures or instruments are not available, the variables are unknown, or there is no guiding framework or theory. Because this design begins qualitatively, it is best suited for exploring a phenomenon (Creswell, Plano Clark, et al., 2003). This design is particularly useful when a researcher needs to develop and test an instrument because one is not available (Creswell, 1999; Creswell et al., 2004) or identify important variables to study quantitatively when the variables are unknown. It is also appropriate when a researcher wants to generalize results to different groups (Morse, 1991), to test aspects of an emergent theory or classification (Morgan, 1998), or to explore a phenomenon in depth and then measure its prevalence.
Choosing a Mixed Methods Design

Exploratory Design Procedures. Like the Explanatory Design, the Exploratory Design is also a two-phase approach, and writers refer to it as the Exploratory Sequential Design (Creswell, Plano Clark, et al., 2003). This design starts with qualitative data, to explore a phenomenon, and then builds to a second, quantitative phase (see Figure 4.4a). Researchers using this design build on the results of the qualitative phase by developing an instrument, identifying variables, or stating propositions for testing based on an emergent theory or framework. These developments connect the initial qualitative phase to the subsequent quantitative component of the study. Because the design begins qualitatively, a greater emphasis is often placed on the qualitative data. Myers and Oezel's (2003) study in appendix D on organizational assimilation is an example of an Exploratory Design. They first explore the topic qualitatively and develop themes from their qualitative data. They then develop an instrument based on these results and subsequently use this instrument in the second, quantitative phase of the study.

Variants of the Exploratory Design. This design has two common variants: the instrument development model and the taxonomy development model. Each of these models begins with an initial qualitative phase and ends with a quantitative phase. They differ in the way the researcher connects the two phases (see center boxes of Figures 4.4b and 4.4c) and in the relative emphasis of the two methods.

Researchers use the instrument development model (see Figure 4.4b) when they need to develop and implement a quantitative instrument based on qualitative findings. In this design, the researcher first qualitatively explores the research topic with a few participants. The qualitative findings then guide the development of items and scales for a quantitative survey instrument. In the second data collection phase, the researcher implements and validates this instrument quantitatively. In this design, the qualitative and quantitative methods are connected through the development of the instrument items. Researchers using this variant often emphasize the quantitative aspect of the study. Using this model, Mak and Marshall (2004) initially qualitatively explored young adults' perceptions about the significance of the self to others in romantic relationships (that is, how they perceive that they matter to someone else). Based on their qualitative results, they developed an instrument and then implemented it during a second quantitative phase in their study.

The taxonomy development model (see Figure 4.4c) occurs when the initial qualitative phase is conducted to identify important variables, develop a taxonomy or classification system, or develop an emergent theory, and the secondary, quantitative phase tests or studies these results in more detail (Morgan, 1998, Tashakkori & Teddlie, 1998). In this model, the initial qualitative phase
produces specific categories or relationships. These categories or relationships are then used to direct the research questions and data collection used in the second, quantitative phase. This model is used when a researcher formulates quantitative research questions or hypotheses based on qualitative findings and proceeds to conduct a quantitative study to answer the questions. In addition, a researcher may identify emergent categories from the qualitative data and then use the quantitative phase to examine the prevalence of these categories within different samples (Morse, 1991) or use taxonomy affiliation as a basis for identifying comparison groups. For example, Goldenberg, Gallimore, and Reese (2005) describe how they identified new variables and hypotheses about predictors of family literacy practices based on their qualitative case study. They then conducted a quantitative path analysis study to test these qualitatively identified variables and relationships.

Strengths of the Exploratory Design. Due to its two-phase structure and the fact that only one type of data is collected at a time, the Exploratory Design shares many of the same advantages as the Explanatory Design. Its advantages include the following:

- The separate phases make this design straightforward to describe, implement, and report.
- Although this design typically emphasizes the qualitative aspect, the inclusion of a quantitative component can make the qualitative approach more acceptable to quantitative-biased audiences.
- This design is easily applied to multiphase research studies in addition to single studies.

Challenges in Using the Exploratory Design. There are a number of challenges associated with the Exploratory Design and its variants.

For all variants:

- The two-phase approach requires considerable time to implement. Researchers need to recognize this factor and build time into their study’s plan.
- It is difficult to specify the procedures of the quantitative phase when applying for initial internal review board approval for the study. Providing some tentative direction in a project plan for the internal review board will be discussed further in Chapter 6.
- Researchers should discuss whether the same individuals will serve as participants in both the qualitative and quantitative phases (see the use of different participants that we propose in Chapter 6).

For the instrument development model:

- The researcher needs to decide which data to use from the qualitative phase to build the quantitative instrument and how to use these data to generate quantitative measures. In Chapter 6, we will discuss procedures for using qualitative quotes, codes, and themes to generate aspects of quantitative instruments.
- Procedures should be undertaken to ensure that the scores developed on the instrument are valid and reliable. In Chapter 6, we will review rigorous steps of instrument and scale development for this process.

For the taxonomy development model:

- Decisions must be made in determining the relevant qualitative findings to use. Options include using themes for variables and the relationships between themes and subthemes (codes) for taxonomy development.

SELECTING A TYPE OF MIXED METHODS DESIGN

Rigorous, high-quality studies result from well-designed research procedures. Mixed methods researchers should select a specific design to use in their studies. We often find researchers wanting to use more than one of the four major designs in a study or to blend different aspects of the designs together. However, we strongly recommend that researchers carefully select a single design that best matches the research problem. This will make the study more manageable and simpler to implement and describe. In addition, it provides the researcher with a framework and logic to guide the implementation of the research methods.

What are the key factors that researchers should consider when choosing a mixed methods design for their studies? Researchers should consider the research problem that they want to study. A primary consideration is that the design should match the research problem, as discussed in Chapter 2. In addition, researchers should evaluate their own expertise and consider the quantitative and qualitative skills that they possess. If they lack expertise with certain methods (e.g., quantitative survey skills or collection of qualitative field notes), they should consider working in a team or selecting a design that does not emphasize that method. Consideration must also be given to the available resources, such as the length of time available to complete the study and funding resources for work in a team or the hiring of research
to mixing the two datasets (i.e., how the two datasets will be related or connected). A decision tree, shown in Figure 4.5, can help identify choices for each of these three decisions.

The Timing Decision

When selecting a mixed methods approach, researchers must answer the question: What will the timing of the quantitative and qualitative methods be? (Figure 4.5a). Timing (also referred to as “implementation” or “sequence”) refers to the temporal relationship between the quantitative and qualitative components within a study (Greene et al., 1989). Timing is often discussed in relation to the time the data sets are collected. However, most importantly, it describes the order in which the researchers use the data within a study (Morgan, 1998). Therefore, timing relates more to when the data are analyzed and interpreted than to when the data are collected, although these times are often interrelated.

As shown in Figure 4.5a, timing within a mixed methods design is classified in one of two ways: concurrent or sequential (Morse, 1993). Concurrent timing occurs when the researcher implements both quantitative and qualitative methods during a single phase of the research study. This means that the quantitative and qualitative data are collected, analyzed, and interpreted at (approximately) the same time. Sequential timing occurs when the researcher implements the methods in two distinct phases, using (collecting and analyzing) one type of data before using the other data type. There are two options for sequential timing. A researcher may choose to start by collecting and analyzing quantitative data and may then subsequently collect and analyze qualitative data. The reverse is also possible: Qualitative data are collected and analyzed first and then quantitative data are collected and analyzed.

The Weighting Decision

In addition to choosing the timing, researchers also need to consider the relative weighting (or emphasis) of the two approaches in the study (Figure 4.5b). Weighting refers to the relative importance or priority of the quantitative and qualitative methods to answering the study’s questions. This choice has been referred to as the “priority decision” (Morgan, 1998) because a researcher decides whether both methods will have equal priority or one method will have a greater priority than the other.

There are two possible weighting options for a mixed methods design, as depicted in Figure 4.5b. The two methods may be given equal weight so that
both play an equally important role in addressing the research problem. On the other hand, the research design may weight them unequally. In this case, one of the methods (quantitative or qualitative) will have a greater emphasis within the study than the other method (qualitative or quantitative).

How does a researcher select a study’s weighting? Numerous considerations influence the comparative weights of the qualitative and quantitative data in a study. Morse (1994) suggested that the theoretical drive or worldview used to guide a study determines its weighting. That is, a post-positivistic worldview calls for a quantitative priority; a naturalistic worldview calls for a qualitative priority; and a pragmatic worldview calls for either equal or unequal weighting, depending on the research question. Morgan (1998) advised that the weighting in a study be based on the strength of which data collection method (quantitative or qualitative) is best suited to address the study’s goals or purpose. The weighting is thus influenced by the goals, the research question(s), and the use of procedures from research traditions such as quantitative experimental designs or qualitative case study designs.

Practical considerations also influence weighting (e.g., Creswell, 2003). For example, it takes more resources to implement a study that gives equal weighting to the two methods. Therefore, with limited resources, a researcher may choose to prioritize one method (quantitative or qualitative) and devote fewer resources to the secondary method (qualitative or quantitative). The weighting may also reflect the researcher’s relative experience with the two methods, particularly if he or she is significantly more familiar with one method than the other. Finally, consider the audiences for the research. Audiences include advisors, committee members, journal editors and reviewers, funding officers, and the disciplinary research community at large. If a study’s target audiences are unaccustomed to or unaccepting of one approach (quantitative or qualitative), then the other method may receive a greater priority in the study’s design.

Researchers should indicate a study’s weighting within their written reports, and research consumers can look for these indications as they read published mixed methods studies. Indicators of a study’s weighting include the following:

- The way the researcher words the title: Quantitative or qualitative terms indicate unequal weighting, and the lack of such terms indicates equal weighting.
- The explicit identification of the guiding worldview used in the study.
- A purpose statement that uses terms that indicate unequal weighting, such as “primary aim” or “secondary purpose.”
- A statement identifying the weighting in the methods section.

- More space being devoted to one method in the article or the emphasis of one method within the abstract.
- More sophisticated and complex procedures used for one method compared to the other.

The Mixing Decision

The third procedural consideration for choosing a mixed methods design is how the quantitative and qualitative methods will be mixed (Figure 4.5c). Mixing is the explicit relating of the two data sets. A study that includes both quantitative and qualitative methods without explicitly mixing the data derived from each is simply a collection of multiple methods. A rigorous and strong mixed methods design addresses the decision of how to mix the data, in addition to timing and weighting.

What procedures are available for mixing quantitative and qualitative data? Conceptually, there are three overall strategies for mixing quantitative and qualitative data (see Figure 4.5c). The two data types can be merged, one can be embedded within the other, or they can be connected.

Merging Data Sets. The data are merged when the researcher takes the two data sets and explicitly brings them together or integrates them. Researchers can merge the two data sets during the interpretation (by analyzing them separately in a results section and then merging the two sets of results together during the interpretation or discussion phase) or during the analysis of the data (by transforming one data type into the other type or consolidating the data into new variables).

Embedding Data at the Design Level. The researcher could decide to embed data of one type within a design of the other type. This is an example of mixing at the design level, not just at the level of data. A researcher may choose to embed qualitative data within a larger quantitative (e.g., experimental) design or to embed quantitative data within a larger qualitative (e.g., phenomenology) design. One form of data can be embedded in a concurrent data collection with the other dataset; alternatively, the embedded data may be collected sequentially before or after the other dataset. Researchers may make interpretations from using the secondary, embedded dataset by bringing the two datasets together in the concurrent approach and keeping them separate in the sequential approach.

Connecting From Data Analysis to Data Collection. A researcher could choose to connect the two data types. Connecting the data occurs when the
analysis of one type of data leads to (and thereby connects to) the need for the other type of data. This can occur in one of two ways. A researcher may obtain quantitative results that lead to the subsequent collection and analysis of qualitative data. A researcher can also start with qualitative results that build to the subsequent collection and analysis of quantitative data. The mixing occurs in the way that the two data types are connected. This connection can occur in different ways, such as in specifying research questions, selecting participants, or developing an instrument or other materials.

**IMPLEMENTING THE DESIGN DECISIONS**

Researchers could choose to use any combination of timing, weighting, and mixing for their mixed methods design. However, based on the underlying logic of the mixed methods designs introduced in this chapter, these criteria are best used in certain combinations. Table 4.2 summarizes the four major designs and their corresponding timing, weighting, and mixing decisions. These decisions, combined with the different research purposes, lead to the following design choices:

- If there is a single phase, both types of data are given equal emphasis, the two sets of results are converged during the interpretation, and the intent is to draw valid conclusions about a research problem, then the choice of design is the Triangulation Design—convergence model.
- If there is a single phase, both types of data are given equal emphasis, one type of data is transformed into the other type, and the intent is to interrelate different data types about a research problem, then the choice of design is the Triangulation Design—data transformation model.
- If both types of data are collected at the same time from a survey and the intent is to use qualitative information to validate the quantitative results, then the choice of design is the Triangulation Design—validating quantitative data model.
- If different types of data are collected to represent different levels of analysis within a system, with the intent of forming an overall interpretation of the system, then the choice of design is the Triangulation Design—multilevel model.
- If quantitative data are used to answer the primary question in an experimental design and qualitative data are embedded within the experimental design (before, during, or after the intervention) with the intent of answering a secondary question related to the experiment, then the choice of design is the Embedded Design—experimental model.

<table>
<thead>
<tr>
<th>Design Type</th>
<th>Variants</th>
<th>Timing</th>
<th>Weighting</th>
<th>Mixing</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangulation</td>
<td>• Convergence</td>
<td>Concurrent: quantitative and qualitative at same time</td>
<td>Usually equal</td>
<td>Merge the data during the interpretation or analysis</td>
<td>QUAN + QUAL</td>
</tr>
<tr>
<td>Embedded</td>
<td>• Embedded experimental</td>
<td>Concurrent or sequential</td>
<td>Unequal</td>
<td>Embed one type of data within a larger design using the other type of data</td>
<td>QUAN(qual) or QUAL(quan)</td>
</tr>
<tr>
<td>Explanatory</td>
<td>• Follow-up explanations</td>
<td>Sequential: Quantitative followed by qualitative</td>
<td>Usually quantitative</td>
<td>Connect the data between the two phases</td>
<td>QUAN ⇒ qual</td>
</tr>
<tr>
<td>Exploratory</td>
<td>• Instrument development</td>
<td>Sequential: Qualitative followed by quantitative</td>
<td>Usually qualitative</td>
<td>Connect the data between the two phases</td>
<td>QUAL ⇒ quan</td>
</tr>
</tbody>
</table>

- If quantitative data are used to answer the primary question in a correlational design and qualitative data are embedded within the correlational design with the intent of explaining the mechanisms that relate the predictor and outcome variables, then the choice of design is the Embedded Design—correlational model.
- If one phase is followed by another phase, the first phase is quantitative, quantitative methods or data are emphasized, the second phase is connected to the results of the first phase, and the intent is to explain these results using qualitative data as a follow-up, then the choice of design is the Explanatory Design—follow-up explanations model.
- If one phase is followed by another phase, the first phase is quantitative, the qualitative phase is emphasized, the second phase is connected to
the results of the first phase, and the intent is to purposefully select participants to best address the qualitative research question, then the choice of design is the Explanatory Design-participant selection model.

- If one phase is followed by another phase, the first phase is qualitative, the two phases are connected by the development of an instrument based on the results of the first phase, and the intent is to develop and implement an instrument on the topic of interest, then the choice of design is the Explanatory Design-instrument development model.

- If one phase is followed by another phase, the first phase is qualitative and results in a taxonomy or emergent theory, the two phases are connected by quantitative testing of the results of the first qualitative phase, the qualitative phase is emphasized, and the intent is to quantitatively generalize the qualitative results, then the choice of design is the Explanatory Design-taxonomy development model.

**WRITING A PARAGRAPH TO IDENTIFY A STUDY’S DESIGN**

Because many researchers and reviewers are currently unfamiliar with the different types of mixed methods designs, it is important to include an overview paragraph that introduces the design when writing about a study in proposals or research reports. This overview paragraph generally is placed at the start of the methods discussion and should address four topics. First, identify the type of mixed methods design and variant model, if appropriate. Next, give the defining characteristics of this design, including its timing, weighting, and mixing decisions. Third, state the overall purpose or rationale for using this design for the study. Finally, include references to the mixed methods literature on this design. An example of an overview paragraph is included in Figure 4.6, along with comments that will assist in identifying these features within the paragraph.

**Summary**

Researchers designing a mixed methods study can choose among the four major types of mixed methods designs: Triangulation, Embedded, Mixed Methods Sequential Explanatory Design

- Names design
- Discusses timing, weighting
- Discusses mixing
- Discusses design rationale
- Cites methodological references

**Figure 4.6** Sample Paragraph Introducing a Mixed Methods Design

SOURCE: Ivanova et al. (2006, p. 5).

Explanatory, or Exploratory. Mixed methods researchers choose a design based on which design best addresses the research problem and the advantages inherent in each design. Researchers should carefully consider the challenges associated with their design choice and plan strategies for addressing these challenges. As part of choosing a design, decisions need to be made about the use of concurrent or sequential timing for the two methods, whether the two methods will have equal or unequal weighting, and how the two methods will be mixed. These decisions, the underlying logic that is best suited to the research problem, and practical considerations are the foundation researchers should use in selecting which variant of the four major mixed methods designs to use for their study.

**Activities**

1. Which of the four major design types will you use in your study? Write a one-paragraph overview that identifies this design; defines its timing, weighting, and mixing; and state your rationale for choosing it for your study.

2. What challenges are associated with your design choice? Write a paragraph that discusses the challenges that you anticipate occurring with your design and how you might address them.
3. Draw a diagram of the procedures you will use, following one of the major variants of the four types of designs advanced in this chapter. Use the depictions of the different variants in the figures as examples to follow.

Additional Resources to Examine


CHAPTER 5

INTRODUCING A MIXED METHODS STUDY

After we understand the characteristics of mixed methods research, assess the preliminary considerations, review studies, and select a research design, we may begin the more detailed process of designing and conducting a mixed methods study. This chapter begins with the first steps in this process: developing an introduction to a mixed methods study. There are several parts to this introduction: writing a title, developing a statement of the problem section, composing a purpose statement, and detailing research questions or hypotheses. These introductory parts begin the write-up of a study, forming the opening paragraphs of a journal article or the first chapter in a dissertation or thesis. For each of these parts, we will highlight two strategies in this chapter: adapting it to mixed methods research and relating it to the design chosen in Chapter 4. To accomplish this, we will use appropriate mixed methods terms and design some elements of research that may be new to the reader, such as a purpose statement, which will be scripted with mixed methods components for a type of design, research questions, which will be written from the perspective of the mixed methods design, and a statement of reasons for the selection of a particular mixed methods design. Writing about mixed methods and the specific design is important because it foreshadows the methods and provides a means by which readers can evaluate the study.
Mixed Methods Research: Designing and Conducting