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An Inclusive Framework for Conceptualizing Mixed Methods Design Typologies: Moving Toward Fully Integrated Synergistic Research Models

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Objectives

After completing this chapter, you should be able to

- conceptualize existing mixed methods design typologies on a continuum from basic to complex;
- propose an inclusive framework to facilitate classification of mixed methods research and development of fully integrated designs;
- provide guidelines for critiquing and designing mixed methods research using the inclusive framework; and
- identify future directions.

Although there have been numerous attempts to develop typologies for classifying mixed methods designs, an inclusive typology remains elusive (Creswell, 2009; Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2006, 2009). Given the difficulties, it seems reasonable to ask: Why even bother with the typology task in the first place? A follow-up question is: Why hasn't the mixed methods field brought some closure to this issue? After all, discussing typologies is as old as the notion that mixed methods is a distinctive third paradigm (i.e., a paradigm separate from qualitative and quantitative; Johnson, Onwuegbuzie, & Turner, 2007). And a third question: Why should we expect this chapter to be anything other than yet another addition to the burgeoning list of typologies, or put another way, do we need another typology?

To promote full disclosure, we believe typologies can offer important services to the mixed methods field and indeed view the first question—*Why do we need typologies?*—as a way to set up a straw man argument. Teddlie and Tashakkori (2003) cite the importance of typologies in establishing a common language and thereby promoting organizational structure within a field, promoting legitimacy of said field, thinking through designs, and supporting pedagogy (see also Teddlie & Tashakkori, 2006). One can appreciate, for example, how communication is facilitated if a manuscript reports a study used a sequential exploratory design using the typology proposed by Creswell and colleagues (Creswell, Plano Clark, Gutmann, & Hanson, 2003). Those who are unfamiliar with mixed methods work can learn a lot by deconstructing the terms *sequential* and *exploratory*, whereas those who are

likely goals. Certainly, other research traditions enjoy the benefits of fairly well-established nomenclatures. For example, those familiar with experimental design work can infer a lot when an author says a study employed a "retrospective two-armed quasi-experiment with baseline equating."[1] Similarly, those with qualitative training will typically glean a great deal of information about design goals from terms such as *ethnography, case study, discourse analysis, constant comparison analyses*, and so on. It is also the case that poorly thought out typologies and associated nomenclatures can undermine understanding. Consider, for example, the idea of causal modeling (i.e., structural equation modeling). This is essentially an analytic procedure using advanced regression techniques, and depending on the underlying design, it may or may not answer causal questions. But the fact that an analysis technique is sometimes thought of as some sort of design has probably led to some confusion about what structural equation modeling can and cannot do (Tabachnick & Fidell, 2007; Wegener & Fabrigar, 2000), a problem that the authors suspect could have been avoided given more careful thought about research typologies and associated naming conventions. In terms of promoting field legitimacy, there is a good argument for saying there are distinctive aspects of mixed methods research if one has to use fairly distinctive terms to describe a mixed methods design. Indeed, it would be interesting to see how well classic designs that used multiple methods (e.g., Rosenthal & Jacobson's [1968, 1992] work on the Pygmalion effect) reflect contemporary mixed methods terminology and thinking.[2] But one need only read about experimental validity, psychometric, and qualitative typologies to see how these systems can facilitate advanced thinking about what a given design can and cannot do (see, for example, Shadish, Cook, & Campbell, 2002). The overall point here is that design typologies and naming systems have implications for communication, pedagogy, organizing research, and so on. This makes continued wrestling with mixed methods typologies a useful endeavor, even if the issue remains problematic.

This segues to the second question, which can be rephrased as *Why has a mixed method design typology been elusive?* Mixed methods designs have been used to address highly diverse questions and appear to be continuously altered as methodologists have addressed questions in creative ways. Indeed, the perspective from the first *Handbook* on this issue remains reasonable today:

> Mixed model designs can be distinguished on a number of different dimensions (e.g., purpose, underlying paradigm) and developing a typology that would encompass all of those dimensions would be impossible. What is more, even if we could list all of the mixed method designs at one point in time, the types of designs would continue to evolve, thereby making the typology no longer exhaustive. (Teddlie & Tashakkori, 2003, pp. 26–27)

The remainder of this chapter deals in part with the last question, *Do we need another typology?* Before proceeding, there are three important points. First, any need to update design typologies is probably a form of good news, as this suggests innovation. Hence, we hope there will be a need to continually revisit the issue. Second, we do not view the current chapter as an introduction of a new typology so much as an attempt to integrate the body of work that has come before us into an inclusive framework that can help researchers identify a typology that suits their needs and proceed accordingly with the study design. Third, in formulating an inclusive framework of mixed methods designs, our goal is to provide a structure that both encompasses existing thinking about typologies and is flexible enough to accommodate innovation.

Precursors to Design Decisions

Decisions about design selection and classification are influenced by considerations about research purpose, the researcher's theoretical perspective or worldview, and concerns about inference quality. In this section, we explore these three sets of precursors.

Research Purpose and Questions

A primary assumption made here is that the research purpose and questions are interlinked and together guide the choice of research method—qualitative, quantitative, or mixed. Hence, any effort to classify a design should consider its underlying purpose, and this is considered within the proposed framework to integrate the various typologies. As is the case with design, the purposes of research have been classified in the literature. Newman,

predict; (2) add to the knowledge base; (3) have a personal, social, institutional, and/or organizational impact; (4) measure change; (5) understand complex phenomena; (6) test new ideas; (7) generate new ideas; (8) inform constituencies; and (9) examine the past. Although these purposes have traditionally been associated with qualitative or quantitative research, Newman and colleagues suggest that mixed methods approaches can apply to many of them. One of the most important contributions of their thinking, consistent with the underlying theme of the first edition of *Handbook of Mixed Methods in Social and Behavioral Research* (Tashakkori & Teddlie, 2003), is that purpose is the driving force behind decision making about research methodology.

Greene, Caracelli, and Graham (1989) propose five categories of purposes for mixed-method evaluation designs: triangulation, complementarity, development, initiation, and expansion. In *triangulation* studies, researchers seek convergence or corroboration of results across different methods (e.g., combined use qualitative and quantitative). In *complementarity*, researchers seek elaboration or clarification of results for one method (e.g., quantitative) from another method (qualitative). In *development* studies, researchers seek to inform later phases of the research method based on findings of prior phases (e.g., results of qualitative study lead to subsequent quantitative study). In *initiation* studies, researchers seek new perspectives or contradictions by the use of mixed methods. In *expansion* studies, researchers seek to extend breadth and depth through use of mixed methods (e.g., qualitative to understand process and quantitative to examine outcomes).

Bryman (2006) proposes an alternative 16-type scheme for classifying research purpose to reflect the variety of research rationales in existing mixed methods literature. Tashakkori and Creswell (2007) extend this discussion and suggest the need for specific "mixed methods" research questions that reflect the typology; for example, sequential and concurrent designs may require different types of research questions (we return to their discussion in the design typologies sections).

Theoretical Perspective

An important determinant of design selection is the theoretical or philosophical perspective

Broadly conceived, this category addresses the theoretical foundations, paradigm, or worldview of the researcher that guides the research. Johnson et al. (2007) refer to the researcher's orientation or purpose in relationship to the needs of the researched (i.e., top-down vs. bottom-up orientation) as critical for distinguishing types of mixed methods. We also include context in which research is conceived or implemented or to which results will be applied. Perhaps the most common distinction, in addition to methods, among qualitative, quantitative, and mixed methods research is that of paradigmatic foundation. Quantitative and qualitative research, for example, can be characterized by respective paradigms of postpositivism and constructivism.[3] Several paradigms or mental models for mixed methods research also have been proposed (Greene, 2007), including the purist (e.g., firmly rooted in postpositivism), aparadigmatic (driven by research purpose or demands of context), substantive theory (driven by the theory underlying the substantive aspect of the work, e.g., prevention theory), complementary strengths (combining the strengths of qualitative and quantitative methods), dialectical (emphasizing the differences in perspective reflected in researchers and methods), and alternative paradigms (pragmatism, realism, emancipation).

The most common alternative paradigm associated with mixed methods research appears to be *pragmatism* (Maxcy, 2003; Morgan, 2007; Tashakkori & Teddlie, 1998, 2003).[4] Morgan distinguishes quantitative, qualitative, and mixed methods on the basis of the connection between theory and data, the researcher's relationship to research process, and the inferences drawn from data. He distinguishes qualitative, quantitative, and mixed methods research (respectively) as follows: (a) The theory-data connection is inductive, deductive, and abductive (inductive and deductive). (b) The researcher's relationship to research process is subjective, objective, and intersubjective (emphasizing the interpersonal nature of research). (c) The basis of inference is context (context-specific), generality (generalizability), and transferability (applicable to other persons and contexts based on similarity of research-applied conditions). Morgan's distinctions portray the commensurability or complementarity of qualitative and quantitative methods within mixed methods research. Such distinctions are intended to overcome the perceived incommensurability or incompatibility of quantitative and qualitative methods as depicted in the early paradigm wars. Furthermore,

answering the research question), the context (e.g., what is most appropriate given the contextual conditions), and potential consequences of the research (e.g., the social or political implications). Consistent with a pragmatic approach and in an effort to reflect current thinking about definitions of mixed methods research, Johnson and colleagues (2007) propose a *contingency theory* of research, in which qualitative, quantitative, and mixed methods research are valued, and decisions about choice and mixing of methods are dependent on the situational contingencies.

Although pragmatics is perhaps the most common paradigmatic foundation for mixed methods, others have been proposed. Greene (2007), for example, takes a *dialectical* position, which emphasizes the importance of differences and the tension created by those differences (e.g., between the perspectives of the researcher and researched). To illustrate application of dialectical stance, Greene uses participatory action research (PAR). The political and social change orientation that is the basis of PAR also is inherent in Mertens's (2003, 2007) *transformative(-emancipatory)* perspective. Mertens (2007) asserts that mixed methods research provides "a framework for examining assumptions that explicitly address power issues, social justice, and cultural complexity throughout the research process" (p. 212). As such, mixed methods designs can help researchers (a) address the cultural and political complexities inherent in the social settings in which research is conducted and (b) engage research participants as partners in creating social change. To achieve these goals, however, requires participation of community members (stakeholders, research participants) and a cyclical research process for building sustainable change.

A transformative paradigm is consistent with participatory models of research, practice, and capacity building (e.g., Eade, 1997; Nastasi et al., 2007; Nastasi, Moore, & Varjas, 2004; Nelson & Prilleltensky, 2005). The collaborative and applied nature of both dialectic and transformative stances is consistent with the *communities of practice* model proposed by Denscombe (2008), in which researchers and practitioners are partners in research that is practice driven and pragmatic. For mixed methods researchers adhering to the communities of practice model, "there is no clear distinction between practitioners and researchers. The practice is the research; the research is the practice" (Denscombe, 2008, p. 277).

Across the alternative perspectives, several commonalities are worth noting. These include tensions between researcher and researched, inductive and deductive thinking, and context-specific and universal applications. Such tensions are perhaps best resolved by using a participatory (e.g., community members) or collaborative (e.g., researcher-practitioner) process, assuming a critical-reflective stance, and focusing on the potential practical and political implications of research findings. Although we cannot resolve the question of the alternative paradigm for mixed methods, we consider the commonalities and strengths of pragmatist, transformative, and communities of practice approaches as critical to an inclusive model of mixed methods research.

Inference Quality Issues

Design decisions related to inference quality address whether one evaluates quality on the basis of quantitative (e.g., internal and external validity) or qualitative (e.g., credibility, transferability) criteria or both. Some methodologists propose that inference quality be evaluated separately for qualitative and quantitative methods prior to mixing (e.g., Ridenour & Newman, 2008). Thus, the researcher must separately account for measurement validity (Messick, 1995) and internal and external validity for quantitative methods (Shadish et al., 2002) and trustworthiness for qualitative methods (Lincoln & Guba, 1985).

Using the concept of *legitimation* to convey validity in mixed methods, Onwuegbuzie and Johnson (2006) extend the consideration of validity to be inclusive of qualitative, quantitative, and mixed methods. Drawing on separate legitimation models for qualitative (Onwuegbuzie & Leech, 2007) and quantitative research (Onwuegbuzie, 2003), Onwuegbuzie and Johnson (2006) proposed a third legitimation model specific to mixed methods, which is intended to ensure or maximize the meta-inferences drawn from the combined methods. The typology of mixed methods legitimation includes the following types: (a) *sample integration*, referring to the relationship between qualitative and quantitative sampling and mixed methods inferences; (b) *inside-outside*, the balance of emic and etic perspectives; (c) *weakness minimization*, the extent to which strengths of qualitative or quantitative methods compensate for respective weaknesses; (d) *sequential*, minimizing the potential influence of

quantizing and qualitizing influences inferences from mixed methods; (f) *paradigmatic mixing*, the extent to which researchers' beliefs relative to qualitative and quantitative approaches are successfully integrated; (g) *commensurability*, the extent to which the meta-inferences reflect integration of qualitative and quantitative perspectives; (h) *multiple validities*, the influence of addressing legitimation from qualitative, quantitative, and mixed perspectives on meta-inferences; and (i) *political*, the value attributed by consumers to meta-inferences drawn from both qualitative and quantitative data.

Dellinger and Leech (2007) have proposed a *unified validation framework*, which incorporates criteria for ensuring validity from traditional quantitative (measurement, internal, external) and qualitative (e.g., trustworthiness) perspectives, with criteria specifically related to validation of mixed methods. Drawing on Messick's (1995) model of construct validity, which emphasizes the evidential and consequential basis for determining meaning of data with regard to its interpretation and use, they propose several elements of construct validation for mixed methods research that parallel the research process (from conceptualization to inference): (a) The *foundational element* refers to the conceptual basis of the study (e.g., grounding in existing research and theory) and the links between conceptual, methodological, analytical, and inferential stages of the research process; (b) the *construct validation element* refers to respective validity of qualitative, quantitative, and mixed methods employed in the study (i.e., the methodological and analytical phases). In addition to the traditional criteria for validity of qualitative and quantitative methods, they proposed specific criteria relevant to the design quality, legitimation, and interpretive rigor of the mixed methods: (c) The *translation fidelity, or inferential consistency audit, element* refers to the links between inferences and the conceptual, methodological, and analytic processes; (d) the *utilization or historical element* refers to how the findings were used and the appropriateness of the utilization; (e) the *consequential element* refers to the social and political consequences of data use and the acceptability of these uses. Consistent with the notion of mixed methods as an alternative paradigm, Dellinger and Leech (2007) characterize construct validation as a “continuous process of negotiation of meaning” (p. 321).

Teddlie and Tashakkori (2009) provide an *integrative framework* for considering inference

includes 10 criteria for evaluating quality as it relates to two broad aspects of research—design quality and interpretive rigor. For each criterion, specific questions are posed to guide the researcher and the critic/reviewer's decisions about inference quality (these questions are reflected parenthetically in the following description of the criteria). The four criteria relevant to *design quality* include (1) design suitability (Is the design appropriate to the research purpose and questions?); (2) design fidelity (Are the qualitative, quantitative, and mixed methods procedures implemented with adequate rigor?); (3) within-design consistency (Is there consistency across all components of the design, e.g., sampling, data collection, analysis?); and (4) analytic adequacy (Are the analytic procedures appropriate and adequate to answer the research questions?). Six criteria pertaining to *interpretive rigor* include (1) interpretive consistency (Are interpretations consistent with findings?); (2) theoretical consistency (Are inferences consistent with existing theory and research?); (3) interpretative agreement (Are interpretations consistent across researchers or scholars in the field and with the interpretations of participants?); (4) interpretive distinctiveness (Are the interpretations the most credible, based on findings and alternative explanations?); (5) integrative efficacy (Are meta-inferences drawn from findings and inferences from various components or strands of the study? Do the meta-inferences account for consistencies and inconsistencies across these findings?); and (6) interpretive correspondence (Do inferences match the study purposes?). (See Teddlie & Tashakkori, 2009, for a more comprehensive explanation and examples of the criteria.) Of course, these criteria could apply to any research study. In the case of mixed methods research, however, one must consider the criteria as they relate to the qualitative, quantitative, and mixed methods components of the study and to the purpose for mixing. For example, in considering interpretive rigor, the researcher must account for the match between findings and interpretations not only with reference to qualitative and quantitative findings separately, but also with regard to inferences drawn from the mixed method findings (meta-inferences).

Current Typologies: State of the Art

A review of the existing literature on mixed methods design typologies revealed a broad

preceding section, we discussed several considerations that are relevant to classifying mixed methods designs, or what we might label as precursors to design selection. As reflected in Table 13.1, the aforementioned precursors to design selection address critical questions related to research purpose, researcher's worldview or context of the research, and inference quality. Design typologies, in contrast, provide classification schemes for depicting the framework related to the mixing of research approaches (qualitative, quantitative) and methods. We summarize the existing typologies as Types I through VI, with the ordering referring to complexity of mixing, ranging from decisions about the number of research strands and priority of methods and data (i.e., basic typologies I through III), to considerations about the integration or synthesis of research approaches (complex typologies IV through VI). Thus, the basic typologies classify designs on the basis of the following criteria, respectively: (I) number of strands or phases of research process; (II) types, mixing, and priority of data; and (III) stages in which mixing of methods/data occurs. The complex typologies classify designs on the basis of approach to integration of methods. For example, Typology IV, focusing on integrated approaches, involves the combination or mixing of precursors and basic design considerations. Typology V deals with iterative or changing approaches, in which the design evolves during multiple phases of research process, a process that is more likely to occur within a research program rather than single study. Typology VI deals with synergistic design approaches that involve attempts to resolve the dialectic nature of mixing methods across paradigms to achieve a true synthesis of qualitative and quantitative research.

Table 13.1 Precursors and Basic and Complex Typologies for Mixed Methods Research

Criteria	*Definition/Key Features*	*Examples of Typologies for Precursors and Designs*
	Precursors to Design Decisions	
Research purpose/question	Purpose of the research, ranging from basic to translational	• Newman, Ridenour, Newman, & DeMarco (2003), typology of research purposes, link purpose to design/methods decisions

		• Greene, Caracelli, & Graham (1989) • Bryman (2006)
Theory, worldview, paradigm, context	Theoretical foundations, paradigm or worldview of researcher; single vs. multiple paradigm & mixing of paradigms; context in which research is conceived, implemented, applied (i.e., conceptual or foundational considerations)	• Tashakkori & Teddlie (1998, 2003), pragmatism • Maxcy (2003), pragmatism • Morgan (2007), pragmatism • Johnson, Onwuegbuzie, & Turner (2007), contingency theory • Greene (2007), dialectical • Mertens (2003, 2007), transformative-emancipatory • Denscombe (2008), communities of practice
Inference quality	Extent to which validity issues are addressed along QUAL-MMR-QUAN continua	• Dellinger & Leech (2007), mixed methods construct validation framework • Onwuegbuzie & Johnson (2006), legitimation • Ridenour & Newman (2008), validity of quantitative and qualitative methods considered separately
Basic Design Typologies		
I. Strand/Phases of Research: Monostrand vs. Multistrand	Single vs. multiple phases, including single study vs. research program	• Tashakkori & Teddlie (2003) • Teddlie & Tashakkori (2009)

Criteria	*Definition/Key Features*	*Examples of Typologies for Precursors and Designs*
II. Methods/Data a. Types of data b. Mixing/sequencing/ implementation	Based on the types, mixing, and priority given to different methods/data: a. Qual-Quan	• Morse (2003), a, b, c (notation system) • Johnson et al. (2007), continuum of mixing,

	c. Dominance of QUAL vs QUAN	(2009), combinations of a, b, c • Creswell & Plano Clark (2007) • Greene et al. (1989)
III. Stage of research process	Points within the research process—research question, sampling, data collection, analysis, inference—where mixing occurs; some models deal only with particular stage	*Mixing across the research process* • Teddlie & Tashakkori (2009) • Ridenour & Newman (2008) • Johnson & Onwuegbuzie (2004) *Mixing at specific stages: Sampling* • Onwuegbuzie & Collins (2007) • Teddlie & Yu (2007) • Kemper, Stringfield, & Teddlie (2003) *Data collection* • Johnson & Turner (2003) *Data analysis* • Onwuegbuzie & Teddlie (2003) *Data inference/data representation* • Erzeberger & Kelle (2003) • Sandelowski (2003)
Complex Design Typologies		
IV. Integrated /Interactive/ Systemic	Some combination of criteria related to precursors and/or basic typologies	• Johnson et al. (2007), research purpose, theory; II, III • Greene (2007), research purpose, theory, inference quality; II, III

Criteria	*Definition/Key Features*	*Examples of Typologies for Precursors and Designs*
		• Maxwell & Loomis (2003), research purpose, theory, inference quality; II, III • Creswell & Plano Clark (2007), research purpose, theory, inference quality; I–III • Creswell et al. (2003), theory, I–III • Onwuegbuzie & Collins (2007), purpose, II (a, b) & III (sampling) • Teddlie & Tashakkori (2009), research purpose, theory, inference quality; I–III (see also Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2006)
V. Iterative	Evolving or changing designs—design changes throughout the research process; earlier phases and findings influence subsequent decision making	• Teddlie & Tashakkori (2009) • Nastasi et al. (2007)
VI. Synergistic	MMR > QUAL + QUAN QUAL = QUAN QUAL ~ QUAN Researcher(s) ~ Design Researcher(s) ~ Participants	• Hall & Howard (2008), synergistic approach • Nastasi et al. (2007), participatory • Shulha & Wilson (2003), collaborative models • Denscombe (2008), communities of practice • Chatterji (2005), extended-term evaluation designs • Mertens (2007), transformative, participatory

NOTE: QUAL = qualitative; MMR = mixed methods research; QUAN = quantitative.

Basic Design Typologies

Tools On this page

Basic design typologies deal with questions relevant to the number of research strands and how and at what stages of the research process the data are mixed. Although we characterize these as basic, the description that follows reflects the evolving complexity of even these most basic classification schemes.

Type I: Research Strands or Phases

Type I typologies address whether the research involves one or multiple phases. Teddlie and Tashakkori (2009; see also Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2006) classify designs as monostrand or multistrand (one vs. multiple strands, respectively) and define strand or phase as encompassing three stages—conceptualization (theoretical foundations, purpose, research questions), experiential (data collection and analysis methods), and inferential (data interpretation, application). A *monostrand* design includes a single phase of the conceptualization-experiential-inferential process. *Multistrand* designs use multiple phases, each of which includes the conceptualization-experiential-inferential process. Teddlie and Tashakkori, of course, consider this criterion in the context of other design criteria and thus present strands within a complex integrated typology as well (see Type IV). *Strand* also might refer to distinctions with regard to single study (cf. monostrand) versus multiple studies or program of research (multistrand; e.g., see Nastasi et al., 2007). Such distinctions have influenced definitions of mixed methods research (see Johnson et al., 2007).

One of the specific typology issues described in Tashakkori and Teddlie's earlier work (1998) is whether to classify an investigation as confirmatory, exploratory, or both. Taking into account the above discussion of theoretical perspectives and inference quality issues behind mixed methods designs, this exemplifies much of the rationale behind typology work in the subfield because mixed methods almost routinely deal with both goals, often within the same design. Briefly, most confirmatory questions are determined on an a priori basis. If a statistical investigation is involved, related analysis plans also should be established at the outset and include adequate sample sizes (i.e., statistical power). Put another way, confirmatory questions largely follow the traditional scientific method one learns in

data analysis and so on. By contrast, exploratory questions need not necessarily be specified in advance and often unfold as investigators learn more about the phenomena being investigated. Although these are often envisaged as a more qualitative issue, there are confirmatory qualitative questions (Maxwell, 2004) and certainly exploratory quantitative applications. From a mixed methods point of view, particularly in multistrand applications, it is possible that not all confirmatory questions can or should be specified in advance. This is especially the case with iterative design applications; thinking through this can be better understood via the Type II Typology, *Methods/Data*, and the Type III Typology, *Stage of the Research Process.* By contrast, more complex typologies, discussed later on, address designs with planned iteration and synergy, often to identify exploratory (and confirmatory) questions that can be articulated only after the context in which they will be asked is well understood, and mixing is done to facilitate interpretation of data.

Type II: Methods/Data

Type II typologies perhaps represent the most basic and earliest distinctions in mixed methods research, that is, the classification of mixed methods designs on the basis of the manner in which qualitative and quantitative methods or data are incorporated. This category of typologies encompasses three components: (a) the types of methods/data or respective use of qualitative and quantitative methods/data; (b) the manner in which the methods and data are mixed, sequentially, concurrently, or embedded; and (c) the priority or dominance given to qualitative and quantitative methods and data in the study design. Morse (2003) provides the basic notation system for depicting the type of methods (Qual, Quan), mixing (simultaneous, qual + quan; sequential, qual → quan), and priority (dominant, QUAL; supplemental, qual) given to qualitative and quantitative methods in a research project or study.[5]

Greene et al. (1989) make distinctions on the basis of the relative status (dominance), independence (methods conceived and implemented independently or interactively), and timing (simultaneous, sequential) of qualitative and quantitative methods. Morse (2003) and Greene et al. (1989) link decisions about methods/data to purpose and paradigm, thus

typologies. As the mixed methods field has evolved, the complexity of even these simple distinctions (e.g., dominance or timing) necessitated more complex depictions of designs.

To better reflect the complexity of mixed methods design, Creswell and Plano Clark (2007) proposed four major design types (each with subtypes) that varied on the basis of timing (concurrent, sequential), weighting (equal vs. unequal; cf. dominance or priority), and mixing (during what phase of research process are data merged and how are they merged). The four major types include *triangulation* (depicted as QUAN + QUAL), *embedded* (QUAN [qual] or QUAL [quan]), *explanatory* (QUAN → qual), and *exploratory* (QUAL → quan). To guide decision making, Creswell and Plano Clark provide a decision tree using criteria of timing, weighting, and mixing. Of course, such decisions are ultimately guided by the researcher's purpose (e.g., an exploratory design for the purpose of instrument development).

In an attempt to provide a more integrated typology, and based on a review of published mixed methods research, Leech and Onwuegbuzie (2009) proposed a three-dimensional typology. The potential variations in level of mixing (partially, fully), time orientation (concurrent, sequential), and emphasis (equal, dominance) of qualitative and quantitative methods yielded eight design types, with an accompanying notational system:

1. Partially mixed concurrent equal status designs (e.g., QUAN + QUAL)
2. Partially mixed concurrent dominant status designs (e.g., Quan + QUAL)
3. Partially mixed sequential equal status designs (e.g., QUAL → QUAN)
4. Partially mixed sequential dominant status designs (e.g., Qual → QUAN)
5. Fully mixed concurrent equal status designs (e.g., QUAN + QUAL)
6. Fully mixed concurrent dominant status designs (e.g., Quan + QUAL)
7. Fully mixed sequential equal status designs (e.g., QUAL → QUAN)
8. Fully mixed sequential dominant status designs (e.g., Qual → QUAN)

Leech and Onwuegbuzie (2009) assert that these eight designs are comprehensive enough to encompass most mixed methods research designs. Of course, one might consider the three dimensions as continua rather than dichotomous, thus potentially yielding an even broader array of mixed methods designs. Johnson et al. (2007) proposed a continuum for representing the three major paradigms, qualitative–mixed methods—quantitative, along which the subtypes of mixed methods research can be placed based on the mixing, timing, and emphasis (see Johnson et al., 2007, for further discussion and illustration of these

Type III: Stage of the Research Process

Another way of classifying mixed methods research is based on the stage of the research process within which mixing occurs. Teddlie and Tashakkori (2009) characterized the stages broadly as conceptualization, experiential (methodological and analytical), and inferential. These three broad stages encompass more specific points in the research process: theory/worldview, research purpose/question, sampling, data collection, data analysis, inference, representation, and application.

Ridenour and Newman (2008) describe the research process as an *interactive continuum* and emphasize the importance of consistency across the stages. They depict mixed methods research as an iterative process along an interactive continuum of qualitative-quantitative research (i.e., as a continuum of theory building and theory testing, respectively). The critical features of their depiction are: (a) research as a process driven by research purpose and questions; (b) the research process (purpose, questions, data collection, analysis, inference, and application) as cyclical; (c) mixed methods as part of a continuum of qualitative-quantitative research; and (d) the self-correcting feedback loops within the research process (i.e., across stages), reflecting both the iterative and interactive nature of research. One might critique any research, but particularly mixed methods research, on the basis of the consistency across questions, methods, and inferences (i.e., does the research question drive methods and inferences); what Ridenour and Newman refer to as the *consistency-question model* (see also Newman et al., 2003). (We return to the consistency-question issue in our consideration of Type IV.)

The basis for classification of designs within Type III is the stage or stages at which mixing occurs. Although some proposed typologies or models suggest qualitative-quantitative mixing (i.e., mixed methods) at every stage of the process (e.g., Ridenour & Newman, 2008; Teddlie & Tashakkori, 2009), others propose typologies on the basis of mixing within a particular stage. For example, Onwuegbuzie and Collins (2007) propose a sampling design typology that includes 24 major sampling schemes for mixed methods research and guidelines for determining sample size. A two-dimensional model of sampling, which combines time orientation (concurrent, sequential) with relationship between quantitative

and qualitative samples (identical, parallel, nested, multilevel), provides the basis for making decisions about the sampling scheme and size.

In addition to typology for more traditional probability, purposive, and convenience sampling, Teddlie and Yu (2007) proposed and illustrated a mixed method typology of sampling that includes five types: (a) basic mixed methods sampling (purposive or quota sampling), (b) sequential mixed methods (sampling of first phase informs sampling decisions of the next, e.g., in QUAN → QUAL design, the qualitative sample is a subsample of the initial quantitative sample), (c) concurrent mixed methods sampling (i.e., through joint or independent probability and purposive sampling in QUAL + QUAN design), (d) multilevel mixed methods sampling (typically requiring multiple sampling techniques across organizational or system levels; e.g., probability sampling of students within schools selected via purposive or stratified sampling), and (e) combination of mixed methods sampling strategies. Teddlie and Yu also provide guidelines for mixed methods sampling that take into account the study's purpose, assumptions of respective qualitative and quantitative methods, inferential requirements, and ethical and practical issues.

Other mixed methodologists have proposed typologies related to data collection (e.g., Johnson & Turner, 2003), data analysis (Onwuegbuzie & Teddlie, 2003), and data inference/representation (Erzeberger & Kelle, 2003; Sandelowski, 2003). The critical question related to Type III typologies is whether we can classify mixed methods designs on the basis of the stage at which the mixing occurs. Alternatively, should mixing occur across the stages of the research process? We return to these questions as we consider the complex typologies and our proposed inclusive framework.

Complex Typologies

The current status of typologies for mixed methods research is perhaps best depicted by complex-level typologies. These of course draw on the basic typologies and vary with regard to how the more specific criteria from Typologies I through III have been integrated or synthesized to reflect a mixed methods research process. This change has paralleled the

and qualitative paradigms. In this section, we review three types of complex typologies: integrated (also labeled as interactive, systemic), iterative, and synergistic. The types represent increasing synthesis of basic typologies across the research process and evolution toward mixed methods research as a synergistic process.

Type IV: Integrated, Interactive, or Systemic

The first level of complexity, Type IV, reflects some combination of criteria reflected in the precursors and basic typologies (see Table 13.1), along with recognition of the importance of considering the context in which research is conceived and carried out and to which findings are likely to be applied. This group of typologies has been variously labeled as integrated, interactive, and systemic, to convey the inter-connectedness of decision making within the overall research process (e.g., theory to application). For the sake of discussion, we refer to these collectively as *integrated typologies*, although we note terminology of specific authors.

The notion of integrated typology is perhaps best reflected in the definition of mixed methods research proposed by Johnson and colleagues (2007). Their definition resulted from a content analysis of definitions from several leaders in the field of mixed methods.

Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with qualitative and quantitative research). It recognizes the importance of traditional quantitative and qualitative research but also offers a powerful third paradigm choice that often will provide the most informative, complete, balanced, and useful research results. Mixed methods research is the research paradigm that (a) partners with the philosophy of pragmatism in one of its forms (left, right, middle); (b) follows the logic of mixed methods research (including the logic of the fundamental principle and any other useful logics imported from qualitative or quantitative research that are helpful for producing defensible and usable research findings); (c) relies on qualitative and quantitative viewpoints, data collection, analysis, and inference techniques combined according to the logic of mixed methods research to address one's research question(s); and (d) is cognizant, appreciative, and inclusive of local and broader sociopolitical realities, resources, and needs. Furthermore,

important research questions *and* providing warranted answers to those questions. This type of research should be used when the nexus of contingencies in a situation, in relation to one's research question(s), suggests that mixed methods research is likely to provide superior research findings and outcomes. (p. 129)

Johnson and colleagues (2007) also identified five themes in the definitions proposed by mixed methods experts. These themes collectively reflect an integrated perspective with regard to precursors and basic design criteria: types of methods/data mixed, timing of mixing, breadth of mixing, rationale for mixing, and researcher orientation.

As Johnson et al. (2007) noted, this integrated typology closely corresponds to that proposed by Greene (2007), although we would extend the depiction of Greene's typology to include criteria related to inference quality. Greene describes *integrated mixed methods designs* as those in which "methods intentionally interact with one another during the course of the study [and thus] offer more varied and differentiated design possibilities" (p. 125). She contrasts these to component designs, in which the qualitative and quantitative methods remain separate during implementation of the research and are integrated only at the interpretation stage. Types of integrated designs include iteration, blending, nesting/embedding, and mixing for reasons of substance or value (Greene, 2007). *Iteration* refers to a situation in which methods from one phase of a study are used to inform subsequent phases. *Blending* refers to the use of complementary yet equal qualitative and quantitative methods throughout the research process, with integration occurring at data analysis. *Nesting* refers to the embedding of a secondary method within the primary study method (e.g., qual within QUAN), with the study design guided by the conceptual model of the primary method; in this case, mixing occurs also at data analysis. *Mixing for reasons of substance or value* (values/substance-based rationale) refers to those designs in which the substantive topic or research ideology mandates the mixing of methods, for example (as Greene notes), Mertens's (2003, 2007) transformative design. A distinct feature of the integrated designs identified by Greene is that the systematic mixing of methods within the research process is driven by the researcher's purpose.

Earlier work by Maxwell and Loomis (2003) reflects the interactive or systemic nature of

methods, validity) are interconnected via some linear or cyclical system. Thus, the relationships between components are just as important as the components themselves. The *interactive model* of mixed method design proposed by Maxwell and Loomis includes research purpose and questions, conceptual framework, methods, and validity; it emphasizes the importance of research as a process. Their model also encompasses contextual factors that influence the research design, for example, researcher skills, participant concerns, ethical standards, and research setting.

Although the typology proposed by Creswell and Plano Clark (2007; see also Creswell et al., 2003) is based primarily on the timing of implementation, priority/weighting, and stage of mixing, the differentiation of types also is linked to researchers' decisions at multiple stages in the research process, from purpose to validity. Thus, purpose or theoretical perspective can influence choice of design, which in turn influences methodological decisions (sampling, data collection, data analysis), decisions about inference quality, and inferential thinking. Similarly, the typology proposed by Onwuegbuzie and Collins (2007) is based primarily on sampling, yet assumes a more integrative perspective. Specifically, these methodologists connect decisions about sampling to considerations of research purpose as well as timing and type of data. Thus, one could consider the typologies proposed by Creswell and Plano Clark and Onwuegbuzie and Collins to be integrative in nature, even though the authors themselves may not label them as such.

Teddlie and Tashakkori (2009; see also Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2006) proposed a typology of *mixed methods multistrand designs*, which they consider to be the most complex of mixed methods designs. The criteria for inclusion in this group are (a) mixing of qualitative and quantitative methods and (b) mixing within or across two or more research strands (with *strand* defined as a conceptualization-experiential-inferential cycle). These designs are thus more likely to be reflected in large-scale research projects of multiyear research programs than in single studies. In addition, the degree of *integration*, according to Teddlie and Tashakkori (2009), depends on the extent to which qualitative and quantitative data are integrated at analysis and inference stages of the research process. If qualitative and quantitative data are both collected but not integrated at analysis and inference stages, they are more appropriately labeled as *quasi-mixed* multistrand designs

Teddlie and Tashakkori (2009) identify and define five design types or families, using the term *family* to portray the possible permutations of each type:[6] (1) *parallel mixed designs*, with application of qualitative and quantitative methods occurring in either simultaneous or lapsed parallel strands (i.e., conceptualization to inference occurs separately for QUAL and QUAN) to answer related parts of the same questions; (2) *sequential mixed designs*, with application of qualitative and quantitative methods in consecutive strands, with subsequent strands and questions developing out of the earlier strands (these can occur in an iterative manner); (3) *conversion mixed designs*, with qualitative and quantitative analysis and inference using one data type (e.g., qualitative data is analyzed qualitatively and quantitized, transformed to quantitative data) to answer related parts of the same questions; (4) *multilevel mixed designs*, with mixing across levels in a multilevel (e.g., organization, individuals) study conducted in parallel or sequentially to answer a set of related questions; and (5) *fully integrated mixed designs*, which is an iterative design and thus more appropriately discussed in the next section.

Type V: Iterative

Mixed methods *iterative designs* are those in which mixing of qualitative and quantitative methods occurs in a dynamic, changing, or evolving manner over the course of the research project or program, such that findings at one stage influence decisions about methods at parallel or subsequent stages. Such designs are perhaps best exemplified by Teddlie and Tashakkori's (2009) family of *fully integrated mixed designs*, in which "mixing occurs in an interactive or iterative manner at all stages of the study. At each stage, one approach [e.g., QUAN] affects the formulation of the other [e.g., QUAL], and multiple types of implementation [i.e., QUAL & QUAN data collection, analysis, and inference] processes occur" (p. 151).

Nastasi and colleagues (2007) have described a type of fully integrated mixed design characterized by a recursive (iterative) mixed method process depicted as Qual→←Quan, to depict multistrand research and development projects. This type of iterative design is one in which mixed methods are used to facilitate development and testing of theory, evaluation

mixing of qualitative and quantitative methods occurs in a recursive manner (with implementation of each research method informing the other, e.g., *Qual* → *Quan* → *Qual* → *Quan...*) throughout the research and development process. Consistent with other integrated designs, consistency across the research process/strand (conceptual-experiential-inferential) is required.

Type VI: Synergistic

The most complex of integrated or iterative designs are mixed methods designs characterized by synergism. Hall and Howard (2008) describe the synergistic approach as a combination of the basic typological and integrated approaches discussed thus far. Consistent with other complex types, the mixing of qualitative and quantitative research in synergistic approaches occurs at the conceptual as well as implementation levels, and thus requires consideration of what we have labeled *precursors* (see Table 13.1). Hall and Howard describe four core principles for synergistic approaches:

1. *Concept of synergy*, to depict the idea that the combined effect of mixing methods approaches results in both a research process and outcomes (findings) that are greater than those produced by the application of either the qualitative or quantitative approach alone. We depict this concept as *MMR > QUAL +QUAN.*
2. *Position of equal value*, to depict the corresponding or equivalent value of qualitative and quantitative approaches (conceptual, experiential, inferential) in a mixed methods approach. Despite variations in weighting given to either during any particular stage of the research process, overall the two approaches are considered equivalent. We depict this concept as *QUAL =QUAN.*
3. *Ideology of difference*, or dialectical perspective (e.g., Greene, 2007), which emphasizes the importance of multiple perspectives associated with mixing of qualitative and quantitative approaches. Consistent with the concept of dialectic, mixing of QUAL and QUAN requires attempts to reconcile conflicting points of view reflected at each stage of the research process (conceptual to inferential); the resulting synthesis is assumed to be necessary for achieving synergism. A dialectical process also is inherent in the integrated and iterative approaches. We depict this concept as *QUAL ~ QUAN.*
4. *Relationships among the researcher(s) and with study design.* This principle reflects (a) the likely necessity of collaboration among researchers, assuming few researchers have sufficient expertise in both qualitative and quantitative approaches; and (b) the importance of a reflective stance by the researchers (sole researcher with qualitative

interpretation of data. We depict this concept as *Researcher(s) ~ Design* to reflect the synergism of researchers and design.

Although the emphasis on qualitative and quantitative methods and perspectives can vary across the research process or strands of research, the synergism resulting from mixing of research approaches must occur at the analysis and interpretation stages. This is consistent with expected outcomes of other complex design types (integrated or iterative), in which inferences drawn from qualitative and quantitative methods are integrated at what Teddlie and Tashakkori (2009) call the final *meta-inference* stage. The meta-inferences reflect a mixed-paradigm perspective resulting from the synthesis of qualitative and quantitative research perspectives applied to the findings. Also inherent in the synergistic approach is consideration of realities of the research context (the social, cultural, ethical, political); this also is consistent with other complex design types. The focus on the real-world context of research becomes critical in any attempts by researchers to bridge the gap between research and practice within the social and behavioral science disciplines. Research models presented by other mixed methodologists embody the synergistic approach (Chatterji, 2005; Mertens, 2007; Nastasi et al., 2007; readers are referred to their work for more detail).

As noted by Hall and Howard (2008), a fully integrated or synergistic approach to mixed methods research is likely to require collaboration among teams of researchers. Other methodologists have asserted requisite collaboration or partnerships for mixed methods research (e.g., Denscombe, 2008; Mertens, 2007; Nastasi et al., 2007; Shulha & Wilson, 2003). Shula and Wilson use a social constuctivist model (see also Nastasi et al., 2004) to explain the synergistic outcomes of researcher collaboration in mixed methods research for the research and the researcher (e.g., enhanced learning and thinking), what we depict as *Researcher(s) ~ Participants.* Denscombe describes the communities of practice as a paradigm for encompassing mixed methods research, emphasizing collaboration between researchers and practitioners. Mertens (2007) and Nastasi et al. (2007) further extend the concept of collaboration to include participation of stakeholders (the “researched” or research participants, practitioners, and representatives of other key stakeholder groups in the community) in the collaborative process.

Collaboration among researchers is intended to enhance the quality of mixed methods

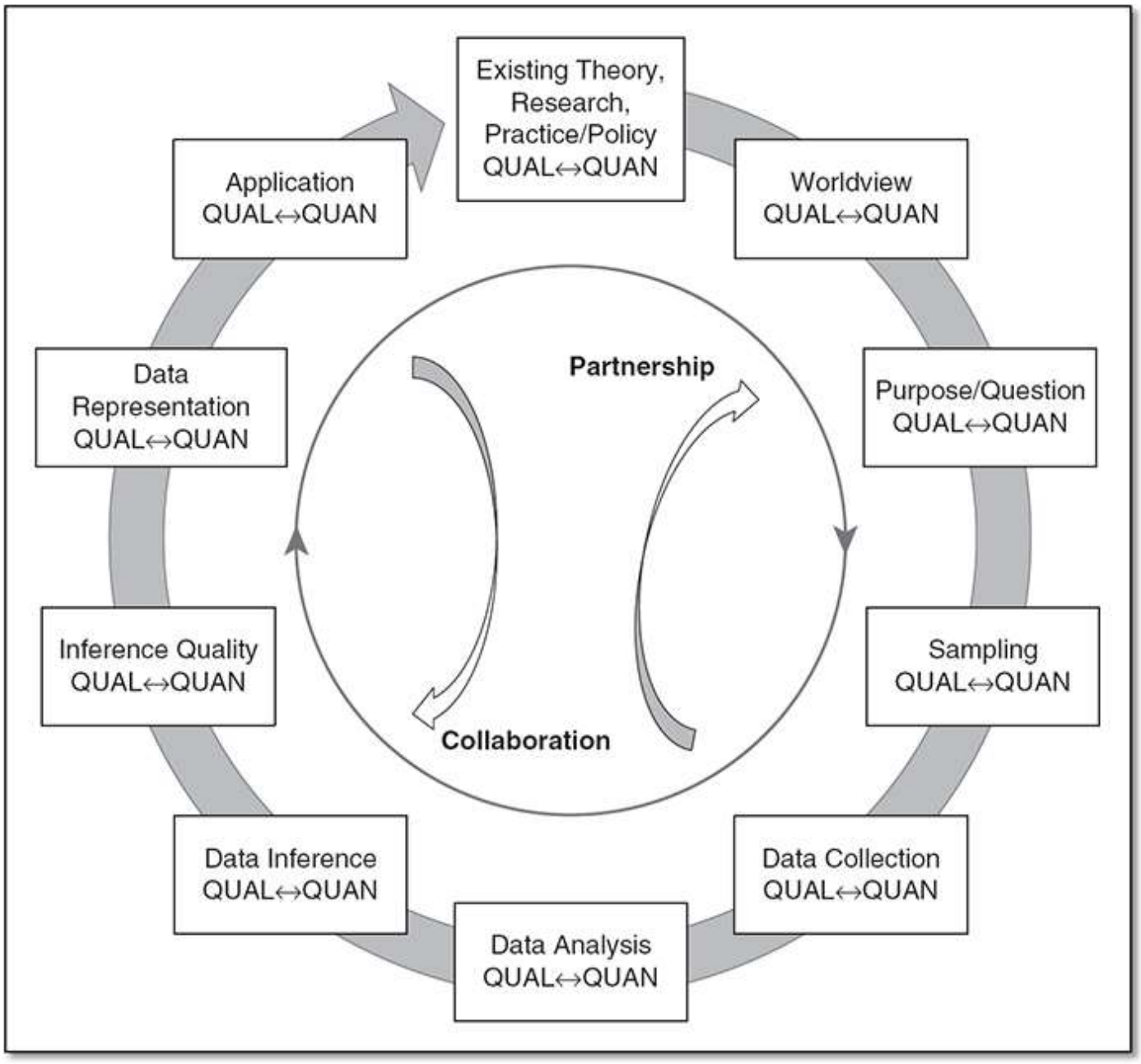
partners in the mixed methods research process is intended to enhance the application to real-world problems, the translation of research to practice, and the achievement of transformative goals. We contend that the integration of such collaboration (among researchers) and participation (of stakeholders) with the synergistic mixed method approach provides the basis for an inclusive model of mixed methods research that can encompass the basic typological and complex integrated models.

An Inclusive Framework of Design Typologies: Extending Complex Typologies

Consistent with Hall and Howard's (2008) synergistic model, we propose an inclusive framework for envisioning the potential variations of mixed methods research designs that combine existing basic and complex typologies. This new framework, *synergistic partnership-based fully integrated mixed methods research*, incorporates the synergistic framework of Hall and Howard with professional collaborative and stakeholder participatory approaches to achieve pragmatic and transformative goals as well as scientific goals. Thus, the framework encompasses all the criteria outlined in Table 13.1 and is intended to be comprehensive in its representation of variations in mixed methods research for achieving a range of purposes. The research process is depicted as cyclical (see Figure 13.1) to reflect the iterative nature of research for specific researchers as well as social and behavioral sciences. The cycle includes all stages of the research process, from conceptualization (research purpose, informed by worldview and existing theory, research, practice or policy) to implementation (sampling to data analysis) to inference (data inference, inference quality, data representation) and application. The framework necessitates answering questions about consistency across stages (cf. consistency-question; Newman et al., 2003; Ridenour & Newman, 2008). In addition, as Figure 13.1 suggests, completing the cycle of research requires considerations of applications to practice or policy as well as theory and research-based knowledge. The proposed framework addresses the critical question of the nature of mixing of methods: How does one combine qualitative and quantitative research in terms of priority and timing (cf. Creswell & Plano Clark, 2007)? In response to this question, the

depicted as QUAL←→QUAN at each stage of the research process (see Figure 13.1). That is, mixing of qualitative and quantitative within mixed methods designs occurs at each stage of the cycle (from theory to application); thus each stage can be represented by QUAL←→QUAN. In this regard, the model incorporates a key characteristic of the fully integrated mixed methods model proposed by Teddlie and Tashakkori (2009) and the dialectical process proposed by Hall and Howard (2008), with allowance for variations in timing and priority across the stages. The question for researchers is how the mixing of qualitative and quantitative approaches occurs at each stage of the process from theory to application. This continual attention to mixing is assumed to be requisite to achieving synergy (MMR > QUAL + QUAN).

Figure 13.1 Synergistic Partnership-Based Fully Integrated Mixed Methods Research: Cycle of Research



NOTE: This cycle reflects the proposed inclusive framework for conceptualizing, designing, and critiquing mixed methods research designs. The framework builds on existing design typologies and is intended to encompass considerations relevant to precursors and basic and complex typologies (depicted in Table 13.1). The key features of the cycle are (a) the centrality of partnership with stakeholders and collaboration among researchers; (b) the cyclical nature of research from conceptualization to application; (c) the iterative nature of the cycle, depicted by the central arrows (reflecting the potential return to earlier stages based on outcomes of subsequent stages; e.g., data inference leads back to more data collection); and (d) the ongoing mixing and attempts at synthesizing qualitative and quantitative perspectives, methods, and data at each stage in the cycle (depicted as QUAL←→QUAN).

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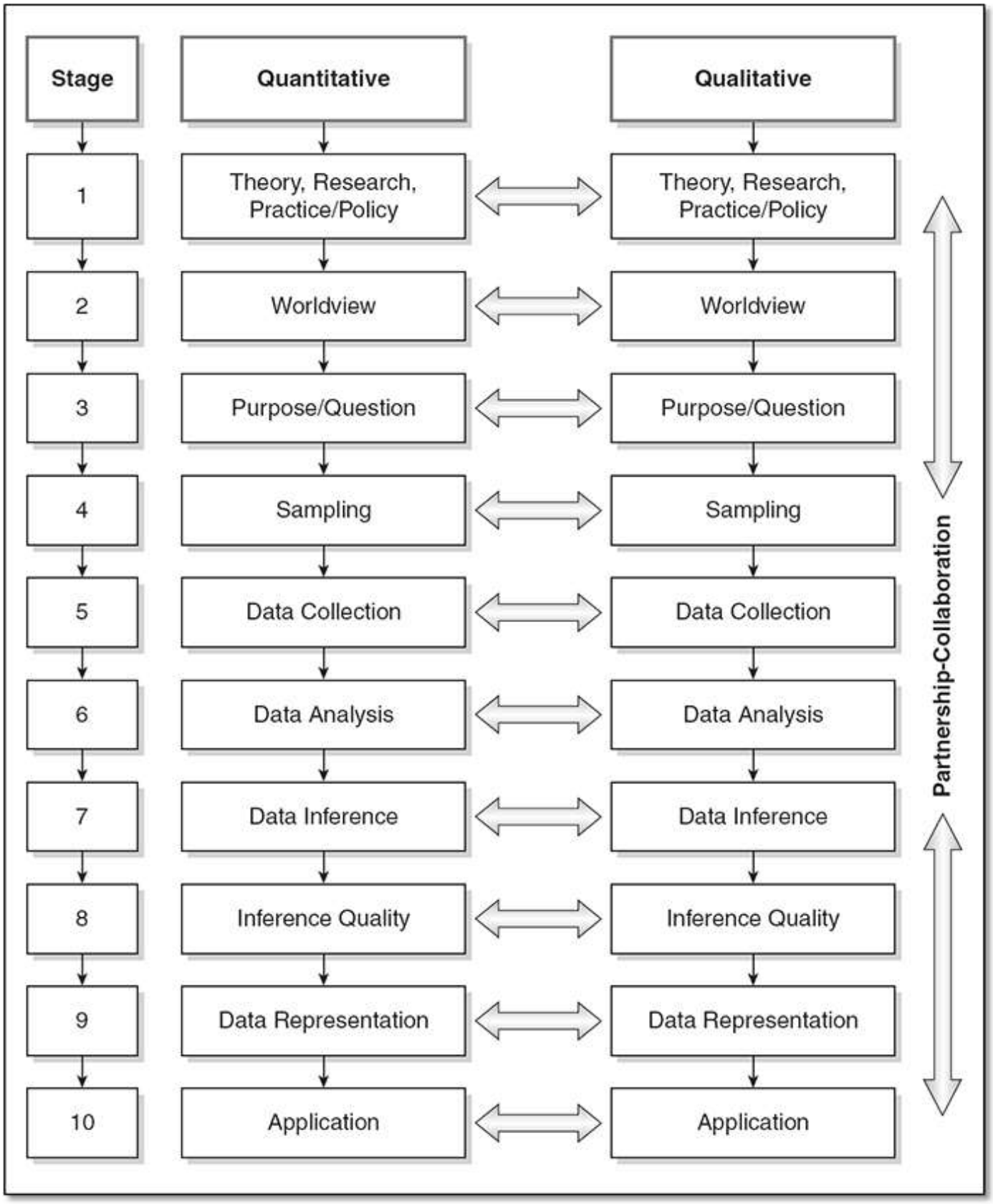
The cycle depicted in Figure 13.1 reflects a complete strand, encompassing conceptual, experiential, and inferential stages (Teddlie & Tashakkori, 2009), and can be applied to

program; multiple cycles) research. Within a single strand, of course, data collection or analysis can lead the researcher back to further data collection. The assumption in multistrand studies is that the cycle would be repeated, for example, to address multiple purposes (e.g., theory development followed by theory testing). At a fully integrated level (cf. Teddlie & Tashakkori, 2009), the mixing of qualitative and quantitative research occurs at every stage.

Most important, the inclusive model reflects the synergism of Hall and Howard's (2008) model, depicted as MMR > QUAL + QUAN, suggesting that the most complex mixed methods designs are those that result in findings and applications that go beyond what either qualitative or quantitative research alone could produce. The synergism is best reflected in what Teddlie and Tashakkori (2009) refer to as meta-inferences that result from the integration of separate qualitative and quantitative inferences in a fully integrated model (and require reconciling discrepancies across findings). We extend the concept of synergism proposed by Hall and Howard (2008) in our inclusion of the participatory/ collaborative components, or what we call partnership-based approaches. Consistent with a social constructivist perspective, we propose that the findings and applications of mixed methods research (and perhaps any research) are further enhanced by partnerships with professionals (researchers, practitioners) with multiple perspectives and expertise and other key stakeholders (e.g., research participants, community members, policymakers) who have vested interests in the outcomes. Thus, the outcomes of partnership-based approaches are greater than the outcomes resulting from sole researcher/perspective approaches. In addition, considerations of synergism affect decisions throughout the research process but are particularly important when planning for or evaluating inference quality. Consistent with the integrative framework of Teddlie and Tashakkori (2009), inference quality must take into account the basis and legitimacy of meta-inferences (i.e., Do meta-inferences reflect the synergism resulting from reconciliation of consistencies and inconsistencies based on different strands of research?). Fundamentally, the synergism of partnership-based fully integrated mixed methods research is assumed to be essential (*de rigueur*) for addressing the complex real-world problems in the social and behavioral sciences.

The partnership-based, synergistic, cyclical, and fully integrated model we propose might best be thought of as an ideal framework for designing and critiquing mixed methods research. We recognize, however, that its application requires considerations of the potential variations of designs reflected in the basic and integrated typologies. To facilitate discussion of application, we have depicted the process in a more linear (step-by-step) format in Figure 13.2. The research process (strand) includes 10 stages; thus, the process would recur in multistrand research. The participation and collaboration process is depicted as extending across the strand.

Figure 13.2 Synergistic Partnership-Based Fully Integrated Mixed Methods Research: Stages of Research Process



NOTE: The linear representation of research cycle (depicted in Figure 13.1) is intended to facilitate application of the proposed framework for conceptualizing, designing, and critiquing mixed methods research designs. The research cycle (strand) is depicted as a 10-stage process, requiring *stage-specific decisions* relevant to purpose, theory, methods of data collection and analysis, and so on; and *overall process decisions* relevant to iteration of

Within each stage, researchers must make decisions relevant to conducting mixed methods research, which then influence the type of mixed methods research that is achieved. To typify the research within an inclusive mixed methods framework requires consideration of both general process and stage-specific features of the research and the extent to which the research meets criteria within the basic and complex typologies that are encompassed in an all-inclusive framework. The answers to these questions would thus provide the standards for designing, classifying, and critiquing mixed methods research. The potential variations, of course, are infinite, and the purpose of this discussion is to propose a framework for reflecting these variations within the context of an all-encompassing yet perhaps ideal framework for mixed methods research.

We propose a set of questions to guide design and classification of mixed methods research with our synergistic partnership-based fully integrated mixed methods framework. These include both general (overarching, process-oriented) and stage-specific questions. Responding to the questions requires an understanding of the precursors and continuum of typologies depicted in Table 13.1 and the inclusive framework and research process as depicted in Figures 13.1 and 13.2. The questions are posed in past tense (to facilitate classification or critique of a design); however, the questions can be rephrased easily to guide design planning as well. We provide a set of exercises at the end of the chapter to facilitate understanding of mixed methods design typologies (depicted in Table 13.1) and the inclusive framework for classifying and designing mixed methods research (Figures 13.1 and 13.2).

We begin with 10 stage-specific questions in Table 13.2. These questions correspond to the focus of the respective research stages depicted in Figure 13.2 and are linked to respective precursor or typological criteria depicted in Table 13.1. Of course, the questions would need to be repeatedly applied to respective strands in multistrand designs. Thus, before proceeding with the series of questions, an initial question for the researcher or reviewer would be this: How many strands are involved in the research process (i.e., is this monostrand or multistrand)?

Stage	Questions
Stage 1	What theory or theories, research, practice, and/or policy formed the basis for the research?
Stage 2	What worldview(s) guided the research?
Stage 3	What was the purpose of the research study or program?
Stage 4	What types of sampling were used? Were these appropriate given the research purposes/questions?
Stage 5	What data collection methods were used? How were the methods mixed with regard to weighting and timing? Were methods appropriate for answering the research questions?

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Table 13.3 lists the overarching or general questions that apply to the research process, encompass more than a single stage, and may need to be addressed at multiple stages (e.g., questions about mixing could apply to both data collection and data analysis) and across strands in multistrand research. These questions are particularly important for determining if the research meets the criteria for the highest level of complexity in mixed methods research as reflected in the complex models (integrated, iterative, synergistic).

Table 13.3 Overarching (General) Design Questions: Research Process Questions

Question

moving forward? Did the results of data inference suggest additional questions leading to further sampling, data collection, etc.?
To what extent did earlier decisions influence subsequent decisions? Was there consistency across stages of the process?
Was there coherence among the stages of the research process? (For example, were the questions linked to decisions about data collection and analysis? Did inferences follow from results of data analysis and address the research purpose or question?
What partners were involved in the research process? To what extent were they involved at each stage?
To what extent did the research involve collaboration of different researchers (e.g., qualitative, quantitative; within or across disciplines)? Did the collaboration contribute to the synergism of mixed

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Conclusions

The proposed inclusive framework for mixed methods research, synergistic partnership-based fully integrated mixed methods research (Figure 13.1), is intended to extend the existing typologies by incorporating both precursors to and key features of the basic and complex typologies (depicted in Table 13.1). The critical elements of the proposed framework are its comprehensiveness, the cyclical nature of the research process, the emphasis on synergism resulting from mixed methods and partnerships among researchers and with other stakeholders, and the relevance to the complexities of real-world research and the application to solving real-world problems. The framework has potential application to the design and evaluation of mixed methods research across the disciplines in the social and behavioral sciences, and thus could be useful to researchers, reviewers of research, and faculty who teach research methods. The utility as a comprehensive typology that can

accommodate the diversity of mixed methods designs, including future developments, is yet to be tested.

Future directions related to the proposed inclusive framework can address questions related to utility and validity of the identified critical elements. We recommend several possibilities:

- To test comprehensiveness and flexibility, apply the typology to classifying existing mixed methods research across social and behavioral science disciplines.
- To test the relevance to complexities of real-world research, develop and conduct mixed methods research studies within field settings influenced by a range of social, cultural, political, ethical, and practical realities.
- To test the relevance to solving real-world problems, develop and conduct applied mixed methods research studies that address social, cultural, and political problems (e.g., with emancipatory-transformative goals).
- To test the partnership-based component, examine application to mixed methods research studies that involve collaboration of researchers with diverse expertise in methods and substantive areas, collaboration of researchers and practitioners, and participation of other stakeholders such as community members, research participants, and policymakers.
- To test synergism, conduct mixed methods research studies with various levels of mixing (integration, iteration, synthesis) and examine differential outcomes with regard to the quality and application of findings.

We expect that attempts to bring structure and organization to the field of mixed methods research and the search for the all-inclusive typology will continue as the field evolves. We encourage mixed methodologists to consider our depiction of an inclusive framework as part of this evolution, and we welcome future developments.

Research Questions and Exercises

The following exercises are designed to facilitate understanding and application of the range of basic and complex typologies depicted in Table 13.1 and the research cycle and stages of the inclusive framework depicted in Figures 13.1 and 13.2.

Exercise 13.1. Application of Mixed Methods Research to Disaster Management

The following scenario depicts the intersection of the personal experiences of one individual

Following the scenario is a guided discussion of the application of the stages of the inclusive framework depicted in Figure 13.2.

Scenario

Maria Gonzales is a 55-year-old female who has been caring for her elderly mother since her father's death 3 years ago. Maria and her family immigrated to the United States from Cuba in the early 1980s and settled in the Miami area. Her mother, Lucinda, has been diagnosed with moderate stage Alzheimer's disease, which has slightly affected her daily functioning. Lucinda is dependent on Maria for driving, financial support, and medical decision making. In addition to living with and providing care for her mother, Maria is employed full-time as a housekeeper through a franchise company that coordinates her schedule for cleaning multiple homes each day throughout the Miami area.

Despite the growing burden of caring for her mother, Maria is committed to providing ongoing care and is strongly opposed to the idea of admitting her to a nursing home. However, to continue her full-time position as a housekeeper, she recently enrolled her mother in a Medicaid-funded adult day care program. Although Maria's employer has been relatively flexible in allowing her time off for her mother's doctors' appointments, she is worried that the company will eventually lose patience. She fears that her increasing requests for time off could jeopardize her employment.

When a hurricane recently struck the Miami area, Maria and her mother were forced to use a public shelter for 3 days, although it did not provide the services necessary to support her mother's physical and mental health needs. Lucinda did not fare well in the chaotic environment of a public shelter. Her cognitive functioning markedly decreased, and she easily became disoriented and confused. Lucinda also began to wander and need assistance with toileting. Her special needs created some tension among the shelter volunteers. Furthermore, Maria needed the assistance of shelter workers because she did not bring enough of her mother's cardiac medication to the shelter.

The hurricane caused significant damage to the Gonzales's home, including the loss of their car. Maria had significant problems interacting with the insurance company. She went nearly

a month without reliable transportation to travel to work or her mother's medical appointments. Maria turned to her church as a primary source of support during these stressful times. It was through her church that Maria was introduced to university researchers, who sought to better understand the needs of individuals caring for their elderly parents during disasters.

Maria was asked to participate in a focus group to discuss her needs after disasters. During the focus group, several of her concerns and recent problems were brought to light, and she found that other local families encountered similar issues. Focus group participants discussed the ways in which they preferred to receive information about disaster preparedness, shelters, and recovery services. These themes were incorporated into a questionnaire that was later administered to a larger population of older adults and caregivers living in the Miami area. The questionnaire findings revealed that a number of people received information from their churches. It was unclear, however, why some churches provided the information about emergency special needs shelters, and others did not. For this reason, a third phase of research was implemented, where church leaders were interviewed to clarify current practices and how dissemination of this information could be improved.

Application of an Inclusive Mixed Methods Research Framework

Stage 1: Theory. The theoretical selection for the purposes of this exercise is the ecological framework (e.g., Bronfenbrenner, 1989). Ecological factors are organized into the following levels of influence: intrapersonal/individual (e.g., knowledge, attitudes, behaviors), interpersonal (e.g., family, social networks), institutional (e.g., voluntary organization, workplace), community (e.g., relationships between organizations, institutions, informal networks), and public policy (e.g., local, state, national laws and policies). Mixed methods can be used to examine both within- and between-factor questions (i.e., person × family × community × institutional).

Discussion Questions

1. How would you apply the ecological framework to this particular scenario? What are the implications for mixed methods research design?
2. What factors need to be considered in exploring disaster preparedness and recovery issues for the older population? Based on existing research? Based on the practical situation depicted in the scenario?
3. How might you involve stakeholders in this stage?

Stage 2: Worldview. Selection of data collection methods must consider cultural orientations and incorporate the language and phrasing for research instruments. Multiple phases of research (pilot testing instruments with different populations) can increase the accuracy of the findings and help to develop more meaningful policy recommendations and social marketing tools. For example, Maria's sense of responsibility for her family may be considered to be a cultural factor that should be taken into consideration. Her relationship with her church, the expectations placed on her as a member, and the support offered through the church can offer valuable insight into her service seeking behavior.

Discussion Questions

1. What cultural factors need to be considered in addressing the needs of an older population following a disaster? What cultural factors are likely to be most critical in this situation? In examining cultural perspectives (worldviews), which stakeholder groups need to be considered?
2. How might stakeholders contribute to this phase as partners or collaborators?
3. How can you apply mixed methods research to examine the worldview of participants and other stakeholders in this scenario?

Stage 3: Research Purpose. Research can be driven by multiple purposes such as addressing real-world applied problems of individuals or groups, attempting to influence government policies, or advancing knowledge in a specific discipline.

Discussion Questions

1. What is the purpose of the research described in this scenario?
2. How does the research purpose influence decisions about mixed methods design?
3. What role would stakeholders play in determining the purpose of the research?

Stage 4: Sampling. Postdisaster research can present logistical challenges related to

collection is proposed: Qualitative → Quantitative → Qualitative. The first phase may require a convenience sample of individuals currently living in emergency shelters or identified through community organizations such as churches. These organizations also could assist in identifying individuals who have elderly parents living at home with them, so that samples of elderly and caregivers could be identified to obtain a representative sample for the quantitative questionnaire. The third phase might include a subset of those completing the questionnaire.

Discussion Questions

1. How would you characterize the current design (as presented in the scenario) based on existing mixed methods typologies?
2. How would you approach sampling within this current scenario?
3. What populations would need to be represented?
4. How would the approach to sampling vary across the proposed phases of data collection: focus groups, quantitative questionnaires, and follow-up interviews?
5. How might stakeholder groups participate in decision making about sampling?

Stage 5: Data Collection. In this scenario, the first phase of data collection relies on focus groups and facilitates identification of central issues facing individuals caring for elderly parents. These data contribute to development of a questionnaire that is culturally and contextually meaningful. The questionnaire serves as the data collection tool for the second phase of the study. The third phase then consists of interviews to provide a deeper understanding of the patterns identified by the analysis of questionnaire data.

Discussion Questions

1. How do the data collection methods relate to the research purposes (or questions)?
2. What other data collection methods might be used in this scenario?
3. How would you characterize the study design in terms of the proposed methods?
4. What alternative mixed methods designs might be appropriate?
5. How would you involve stakeholders in decision making about methods or in the process of data collection?

Stage 6: Data Analysis. In the current scenario, the data collection methods yield textual data from focus group and follow-up interviews and quantitative data from questionnaires.

Discussion Questions

1. What procedures might you use to analyze the textual data? For example, how would you identify and select code categories? Would these differ for data generated from focus groups and follow-up interviews?
2. How would you analyze the quantitative data?
3. How will you integrate data from the three methods—focus groups, questionnaires, and follow-up interviews? How might findings from respective data sets influence decisions about analysis of other data sets (e.g., how will findings from questionnaires influence coding of follow-up interviews or re-analysis of focus group data)?
4. What role can stakeholders play in data analysis decisions and implementation?

Stage 7: Data Inference. Inferences or conclusions drawn from the data are likely to be influenced by data sets, considered both individually and collectively. Similarly, the three data sets might contribute differently to addressing research purposes or questions. For example, in this scenario, the focus group data will inform the development of the questionnaire, and the follow-up interview data can help to clarify findings from the questionnaire data.

Discussion Questions

1. How do decisions related to theory, research purpose, design, sampling, and data collection and analysis methods influence inferences that can be drawn from the resulting data?
2. In this scenario, what types of inferences are possible from the different data sets? For example, can one make generalizations to the population based on focus groups? Questionnaires? Follow-up interviews? Similarly, how can the different data sets contribute to decision making about programming for the elderly in this postdisaster context? How can data contribute to policy decisions?
3. How do the different data sets address the purposes of the research for this scenario?
4. What are the possible advantages and disadvantages of integrating data across the three data collection methods?
5. What are the advantages and disadvantages of mixed methods research (compared with qualitative or quantitative designs) when making inferential decisions? (Hint: Consider the added value for various research purposes.)
6. How can this phase contribute to the generation of new research questions—to be addressed within this study (i.e., recursive design) or in subsequent research?
7. How can the stakeholders contribute to this stage of the research process?

Stage 8: Inference Quality. One might assume that the triangulation of methods and subsequent data integration (e.g., in this scenario) can enhance the quality of inferences and researchers' confidence in the results and subsequent application to practice or policy making. Issues of inference quality have been addressed from qualitative, quantitative, and mixed methods design perspectives. Consider the different approaches to ensuring quality in mixed methods research discussed in this chapter.

Discussion Questions

1. What strategies for ensuring inference quality might you apply in this scenario?
2. For this scenario, how might considerations of inference quality change the mixed methods design, selection of methods, sampling, and so on?
3. How might inference quality influence decisions to return to earlier stages of the research process (e.g., conduct more data collection following analysis)?
4. How does the research purpose influence the selection of strategies for ensuring quality?
5. What role would stakeholders play in making decisions about inference quality?

Stage 9: Data Representation. Decisions about data representation are influenced by research purpose, design features, and intended audiences. In the current scenario, there are several potential audiences for data dissemination.

Discussion Questions

1. Identify the potential audiences relevant to this scenario.
2. What are the various ways in which the data from this scenario could be represented (consider data sets individually and collectively)?
3. How will the choice of audience influence the representation of data?
4. How can the stakeholders assist in decisions about data representation?

Stage 10: Application. The most likely applications of research findings for this scenario are identification of service needs for the population, development of relevant services in affected communities (including the immediate context), and recommendations for policy related to disaster management. Thus, mixed methods research can contribute to practice and policy. Furthermore, research findings can contribute to development of theory and the empirical knowledge about disaster management for the relevant social and health science

Discussion Questions

1. What are the potential applications of findings in this scenario? How might we design the study differently to enhance application to science (theory, research), practice, or policy?
2. How can stakeholders participate as collaborators or partners in decisions about application of findings?
3. How are decisions about research purpose, theory, and design likely to influence potential applications of findings?
4. What are the advantages and disadvantages of mixed methods research for informing science, practice, and policy? How do we best integrate methods within mixed methods designs to maximize application to science, practice, and policy?

Exercise 13.2. Critique of Existing Research

Identify a mixed methods research study from literature in your discipline. Critique the article using the stage-specific and overarching process questions found in Tables 13.2 and 13.3.

Exercise 13.3. Designing Mixed Methods Research

Propose a mixed methods research study, using the stage-specific and overarching process questions found in Tables 13.2 and 13.3 to inform design decisions.

Notes

1. This would be a design in which two study conditions, such as a treatment and control group, were formed prior to the start of the investigation using nonrandom procedures, so the researcher tried to establish that the groups were similar on a set of observed characteristics before treatment began.

2. This chapter ends with a discussion of future directions pertaining to the inclusive framework, one of which is to apply it to a series of studies to both test it and see what can be learned about the field. For example, would the Rosenthal and Jacobson (1968) work be

classified as a mixed methods design using contemporary definitions? If so, would it be reliably classified into one of the typologies that informs the framework presented here?

3. Lincoln and Guba (1985) provide one of the early distinctions among the paradigmatic foundations of qualitative and quantitative methods.

4. For more comprehensive discussion of the paradigms relevant to mixed methods, see Greene (2007).

5. Less common notations depict recurring or iterative mixing, to reflect more complex designs; for example, Qual > Quan > Qual > Quan, or Quan →← Qual (Nastasi et al., 2007; Sandelowski, 2003).

6. See also Teddlie & Yu's (2007) related sampling typology discussed in the Type III section of this chapter.

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