



MIXED METHOD DESIGN PRINCIPLES AND PROCEDURES

JANICE M. MORSE & LINDA NIEHAUS

Mixed Method Design

Developing Qualitative Inquiry

Series Editor: Janice Morse University of Utah

Books in the new **Developing Qualitative Inquiry** series, written by leaders in qualitative inquiry, will address important topics in qualitative methods. Targeted to a broad multidisciplinary readership, the books are intended for midlevel/advanced researchers and advanced students. The series will forward the field of qualitative inquiry by describing new methods, or developing particular aspects of established methods.

Series Editorial Board: H. Russell Bernard, Kathy Charmaz, D. Jean Clandinin, Julianne Cheek, Juliet Corbin, Carmen de la Cuesta, John Engel, Sue E. Estroff, Jane Gilgun, Jeffrey C. Johnson, Joe Maxwell, Carl Mitcham, Katja Mruck, Judith Preissle, Jean J. Schensul, Sally Thorne, John van Maanen, Max van Manen

Volumes in this series:

- 1. Autoethnography as Method, Heewon Chang
- 2. Interpretive Description, Sally Thorne
- 3. Developing Grounded Theory: The Second Generation, Janice M. Morse, Phyllis Noerager Stern, Juliet Corbin, Barbara Bowers, Kathy Charmaz, and Adele E. Clarke
- 4. Mixed Method Design, Janice M. Morse and Linda Niehaus



MIXED METHOD DESIGN

Principles and Procedures

Janice M. Morse and Linda Niehaus



First published 2009 by Left Coast Press, Inc.

Published 2016 by Routledge 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN 711 Third Avenue, New York, NY 10017, USA

Routledge is an imprint of the Taylor & Francis Group, an informa business

Copyright © 2009 Taylor & Francis

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Notice:

Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Library of Congress Cataloging-in-Publication Data

Morse, Janice M.

Mixed method design : principles and procedures / Janice M. Morse, Linda Niehaus.

p. cm.—(Developing qualitative inquiry)

Includes bibliographical references and index.

ISBN 978-1-59874-297-8 (hardcover : alk. paper)—ISBN 978-1-59874-298-5 (pbk. : alk. paper) 1. Social sciences—Research—Methodology. 2. Social sciences—Statistical methods.

3. Qualitative research. 4. Quantitative research. I. Niehaus, Linda. II. Title.

H62.M6611 2009

300.72—dc22 2009021214

ISBN 978-1-59874-297-8 hardcover ISBN 978-1-59874-298-5 paperback



Contents

List of Illustra	tions	7		
Preface:	Roadmap: Before You Read This Book			
Chapter 1:	Mixed Method Design: Who Needs It?	13		
Chapter 2:	The Nuts and Bolts of Mixed Method Design	23		
Chapter 3:	Theoretical Drive	39		
Chapter 4:	Pacing the Components	47		
Chapter 5:	The Point of Interface	55		
Chapter 6:	Sampling for Mixed Method Designs	63		
Chapter 7:	Planning a Mixed Method Project			
Chapter 8:	3: Qualitatively-Driven Mixed Method Designs			
Chapter 9:	er 9: Quantitatively-Driven Mixed Method Designs			
Chapter 10:	Complex Mixed and Multiple Method Designs			
Appendix I:	Glossary for Mixed Method Designs	157		
Appendix II:	Dissecting Mixed Method Publications			
Appendix III:	Search Filters for Retrieving Mixed Method Studies from Bibliographic Databases	167		
References		181		
Index		189		
About the Aut	hors	194		

Dedication

To Bob: who listens, critiques, and reads and reminds me that life transcends method —Jan

To Aimee: my little dog, who is supportive in her unconditional love and patience —Linda



List of Illustrations

Figures

Figure 2.1:	Single Method Designs	36	
Figure 5.1:	The Point of Interface: Two Circles Show the Positions where the Two Data Sets Meet	56	
Figure 6.1:	Sampling Issues for QUAL + quan Mixed Method Designs	68	
Figure 6.2:	Sampling Issues for QUAL—> <i>quan</i> Mixed Method Designs (Using a Supplemental Quantitative Data Collection Strategy)		
Figure 6.3:	Sampling Issues for QUAL—> <i>quan</i> Mixed Method Designs (Using a Supplemental Quantitative Data Analysis Strategy)	71	
Figure 6.4:	Sampling Issues for QUAN + qual Mixed Method Designs	73	
Figure 6.5:	Analysis Issues for QUAN + qual Mixed Method Designs	75	
Figure 6.6:	Sampling Issues for QUAL—>quan Mixed Method Designs	76	
Figure 8.1:	An Overview of QUAL-quan Mixed Method Designs	89	
Figure 8.2:	Overview: Examples of QUAL-quan Components	90	
Figure 8.3:	QUAL + <i>quan</i> Mixed Methods Design, Using an External Quantitative Sample	102	
Figure 8.4:	QUAL—> <i>quan</i> Mixed Method Design to Compare and to Reveal Change	104	
Figure 8.5:	QUAL—>quan Mixed Method Design (Directly Transforming Descriptive Data)	106	
Figure 8.6:	Overview: Examples of QUAL-qual Components	111	
Figure 9.1:	An Overview of QUAN-qual Mixed Method Designs	118	
Figure 9.2:	Overview: Examples of QUAN-qual Components	121	
Figure 9.3:	QUAN + qual Mixed Method Design	132	
Figure 9.4:	QUAN + <i>qual</i> Simultaneous Mixed Method Design with Data Transformation	134	
Figure 9.5:	QUAN—>qual Mixed Method Design	137	
Figure 10.1:	An Example of a Multiple Method Research Program	149	

Tables

Table 1.1:	Principles of Mixed Method Design	21
Table 2.1:	Types and Characteristics of Simultaneous Mixed Method Designs	28
Table 2.2:	Sequential Mixed Method Designs and Their Characteristics	29
Table 2.3:	Core Positions of the Point of Interface	30
Table 2.4:	Role of the Supplemental Component for the Major Designs	31
Table 5.1:	QUAN + <i>qual</i> Designs: <i>qual</i> Strategies that May and May Not Be Used with an Analytic Point of Interface	58
Table 10.1:	Ethnographic Reflexive-Emergent QUAL Design	143
Table 10.2:	Schematic Outline of QUAL->QUAN Multiple Method Project	150
Table 10.3:	Multiple Method Research Program with an Inductive Thrust (QUAL)	152
Table 10.4:	Notes on Principles of Mixed Method Design	154

2



Aim to become an expert methodologist in both qualitative and quantitative inquiry. The trick is to be able to select the best methods to answer your research question(s), to be able to recognize what is possible given your methodological toolbox, and to be alert to (and avoid) all possible pitfalls. Our goal is that you reach your research goal without compromising the quality of your research.

In this chapter, we will give you a "feel for" the basics of mixed method design. We are aware that we are introducing a lot of new terminology all at once, and will define terms as we go along, but you may wish to consult the glossary in Appendix I. Here, we will discuss considerations for conducting mixed method research and later discuss basic mixed method designs.

Anatomy of Mixed Method Design

By "anatomy," we mean the identification of the main components of the mixed method research project. Briefly, the two main components are the core component (or the "backbone" of the project) and the supplemental project (or the incomplete method, introduced to expand the scope of the project).

The Core Component

The core component of the project is the primary, main, or foundational study in your project. It is the method that is used to address the major part of the research question. Think of the core as the backbone of your project, onto which all other components, methods, or strategies will be attached. The core component is always dominant in mixed method studies. The core method must be conducted at a standard of rigor such that, if all else were to fail, it could be published alone. Principle #2: The more you know about research methods, the easier mixed methods will be!

The Supplemental Component

Although the core component is always dominant, complete (i.e., scientifically rigorous), and can stand alone, the supplemental component is conducted only to the extent that the researcher obtains the information needed and could not be published alone. We therefore refer to the methodological research tool used to obtain supplementary information as a *strategy*, rather than a *method*. The supplemental project, conducted alongside the core method, is relatively independent but joins the main project at the *point of interface*, or where the two methods come together.

Theoretical Drive

The *theoretical drive* is the conceptual direction of the project overall and is identified from the research question. What is the overall purpose of the research? Is it for exploration? Or is it for theory testing? If it is to explore and to describe some phenomena, the research is working inductively. One may argue that qualitative inquiry involves verification, and therefore is not purely inductive, but the *drive* may be considered the general, overall stance. Note that the theoretical drive guides the use of the core method, so we call a study either qualitativelydriven or quantitatively-driven, denoting the drive in upper-case letters: QUAL for qualitatively-driven and QUAN for quantitatively-driven. The supplemental component is indicated with lower-case letters. Therefore, we record a qualitatively-driven project with a quantitative supplemental component as QUAL-*quan*; conversely, a QUAN-*qual* project is quantitatively-driven, despite the qualitative supplementary project, matching the direction of the core component.

Pacing

Pacing refers to the mode in which the core and complementary component are synchronized. There are two main modes of pacing: simultaneous (also labeled "concurrent" [Creswell & Plano Clark, 2007]) and sequential. When conducting a simultaneous mixed method design, both the core and the supplementary components are conducted at the same time, and indicated with a + (plus) sign. When using simultaneous mixed method design, it is important to keep both components separate, so that questions, data, and analysis do not merge. This is of particular risk when conducting OUAL-aual sequential mixed method design, when theoretically a researcher may be conducting a secondary analysis using the same data (and perhaps supplementing it with some new data) but focusing on a different dimension of the phenomenon under investigation using one or more strategies drawn from a different method. If a project is paced sequentially, this is indicated with an->(arrow), so that a qualitativelydriven project with a quantitative supplemental component is labeled as QUAL->quan and QUAN->qual indicates a quantitativelydriven project with a qualitative supplemental component.

The theoretical drive is the overall inductive or deductive direction of a research project.

Pacing is the mode of synchronization of the core and the supplemental components. Combinations of different core and supplemental components make eight possible mixed method designs. Nomenclature for different types of mixed method designs is presented in Box 2.1.

Box 2.1: Eight types of mixed methods design				
QUAL + <i>quan</i> :	Qualitative core component of the project (inductive theoretical drive) with a <i>simultaneous</i> quantitative supplementary component.			
QUAL \rightarrow quan:	Qualitative core component of the project (inductive theoretical drive) with a <i>sequential</i> quantitative supplementary component.			
QUAL + qual:	Qualitative core component of the project (inductive theoretical drive) with a <i>simultaneous</i> qualitative supplementary component.			
QUAL \rightarrow <i>qual</i> :	Qualitative core component of the project (inductive theoretical drive) with a <i>sequential</i> qualitative supplementary component.			
QUAN + qual:	Quantitative core component of the project (deductive theoretical drive) with a <i>simultaneous</i> qualitative supplementary component.			
QUAN \rightarrow qual:	Quantitative core component of the project (deductive theoretical drive) with a <i>sequential</i> qualitative supplementary component.			
QUAN + quan:	Quantitative core component of the project (deductive theoretical drive) with a <i>simultaneous</i> quantitative supplementary component.			
QUAN \rightarrow quan:	Quantitative core component of the project (deductive theoretical drive) with a <i>sequential</i> quantitative supplementary component.			

An earlier version of Box 2.1was previously published as Morse, J. M., Wolfe, R., & Niehaus, L. (2006). Principles and procedures for maintaining validity for mixed method design. In Leslie Curry, Renée Shield, & Terrie Wetle (Eds.) *Qualitative Methods in Research and Public Health: Aging and Other Special Populations*. (pp. 66 & 67). Washington, DC: GSA and APHA. Reprinted with permission of the American Public Health Association.

Point of Interface

The *point of interface* is the position in which the core and supplement component meet during the conduct of the research. Usually this is in the *results point of interface*, that is, in the writing of the research results ("research narrative") when findings emanating from the core component form the theoretical base of the results, and the results from the supplemental project embellish and add to the description of

The *point* of *interface* is the position in which the two methods join—either in the data analysis or in the narrative of the results. components, conceiving how the results will be written up will assist in the determination of which method forms the core component, particularly in QUAL-*qual* projects. For instance, if you are preparing a study using grounded theory and phenomenological interviews, the grounded theory component MUST serve as the core component and MUST form textual the theoretical base of the results. Grounded theory describes process and develops midrange theory. Its scope both in abstraction and over time is more expansive than phenomenology (with results that add depth, but only in "snapshots," as it does not do change and transitions well). Therefore, phenomenological interviews serve as the strategy rather than as the method. We will address this issue further in Chapter 6.

the core results. In addition to considering the "dominance" of the two

The analytic point of interface: The second position where the studies meet is in the analysis where, in a QUAN-qual study, the results of the supplementary qualitative component are transformed from textual to numerical data, and incorporated into the quantitative analysis. With this design, the qualitative study must meet certain requirements (see Chapter 8): All participants must have been asked the same questions (preferably in the same order), and these questions are then coded and the responses moved in to the quantitative data set as variables for analysis. The qualitative method that is best suited to such data transformation is semistructured research.

Doing Mixed Method Research

You must always be consciously aware of the theoretical drive or conceptual direction in which your project is moving overall (i.e., consider: Are you working inductively or deductively?), and this is *determined by the research question*. The theoretical drive guides the main study or *core component* for which the primary method is used. Outlining your design will help you understand this, and we will guide you through how to sketch out the projects and the sequences and how to denote the core component (i.e., the main method—and the theoretical drive) in upper-case letters and supplementary components (or additional strategies) in lower-case letters. Consider the *pacing* of the project—how the two projects will be conducted, *simultaneously* (at the same time, of course), indicated by a (+) sign, or one after the other, or *sequentially*, indicated by an arrow (—>).

Now, think about the question: "Are you working inductively or deductively?" The theoretical drive is usually evident by answering this question. But there are two traps in determining the theoretical drive. First, the order in which the components are actually conducted may not be consistent with the theoretical drive or the pacing of the project. For instance, in a QUAL-*quan* study, the theoretical drive is qualitative, the core method may be grounded theory, and the supplemental strategy used may be a physiological measure of anxiety. When conducting the grounded theory, the interviewer may use retrospective interviews. Meanwhile, the researcher may obtain the anxiety scores

The core and the supplement strategies meet in two positions: the analytic point of interface and the results point of interface.

Principle #3: Recognize and respect the project's theoretical drive.

for the past 6 months from the participants' counseling records. As the grounded theory is constructed for the past year, the physiological scores are inserted to increase our understanding of the participants' experience. Thus, the chronological order of presentation of each component does *not* necessarily indicate the theoretical drive.

If we have a mixed method design that has a supplemental component from the *same paradigm* as the core component (i.e., you have a *qualitative* core and a *qualitative* supplemental strategy, or a *quantitative* core and a *qualitative* strategy), then conducting the research is relatively easy. You will probably not get into difficulties with the sampling frame or with the way you are thinking about the data (descriptively or testing). Be true to the theoretical drive in your project (i.e., the inductive or deductive direction, as the case may be), in particular when *it comes time to write the narrative of the findings*. The core component provides the theoretical/analytical base from which you write (think of it as the main story), and the supplement component will provide information that will embellish this theoretical base.

Core Component: Conducting the core component part of the project should be easy—you follow standard research rules outlined in many basic research texts.

Supplemental Component: Again, the supplemental component is conducted in a textbook fashion according to the method as dictated by the research question, with some considerations for sampling, the degree to which to project is completed, and how the projects meet at the point of interface.

Problems occur when we have a supplemental component from a different paradigm. The golden rule is that this supplemental component must adhere to its own inductive or deductive principles. The tricky part is fitting it in somehow with the main (core) method for:

- selecting the sample
- meeting the main study at the point of interface

Between these two points, the supplemental component is conducted as recommended in research texts, except it is completed only to the point that the researcher is certain of the findings and has his or her answer. So,

- *if* it is a qualitative supplemental component, saturation may not be reached;
- *if* it is a quantitative supplemental component, nonparametric statistics may be used, or the measure obtained may be compared with external norms rather than calculated internally on data obtained.

Methodological problems arise when the researcher has two projects each from different paradigm (i.e., working with a qualitative methods and a quantitative supplemental project or vice versa).

If your question is qualitatively-driven, select an appropriate qualitative method and plan for a purposeful and/or theoretical sample, **Principle #4:** Recognize the role of the supplemental component.

Principle #5: Adhere to the methodo-logical assumptions of each method.

The supplemental component must adhere to its own inductive or deductive principles. Qualitativelydriven = inductive theoretical drive Quantitativelydriven = deductive theoretical drive

Principle #6: Carefully consider the pacing of the components.

methods of analysis, presentation of the results according to the level of theoretical development, and so forth.

If the main study is quantitatively-driven, abide by all of the assumptions and rules of quantitative inquiry. This includes: the rules of formulating a question or the form of the hypothesis, considerations for instrumentation selection, the rules of sample (appropriateness: randomization [from an appropriate sample] and adequacy [size]), selection of appropriate statistical tests, and so forth.

Remember that the core method used to address the research question in the main study is the "standard method" for whatever method you are using. The core component (main study) is complete and rigorous.

If the qualitative and the quantitative projects are conducted at the same time, this is a *simultaneous mixed method design* and is denoted with a + sign. Simultaneous mixed method designs, and their characteristics, are shown on Table 2.1.

Table 2.1 Types and characteristics of simultaneous mixed method designs

Simultaneous mixed method designs	Characteristics of the design		
QUAL + qual	This design comprises:		
	A qualitatively-driven core componentA qualitative supplementary component		
	The core and supplemental components are conducted <i>simultaneously</i> .		
QUAL + quan	This design comprises:		
	• A qualitatively-driven core component		
	• A quantitative supplementary component		
	The core and supplemental components are conducted <i>simultaneously</i> .		
QUAN + quan	This design comprises:		
	• A quantitatively-driven core component		
	• A quantitative supplementary component		
	The core and supplemental components are conducted <i>simultaneously</i> .		
QUAN + qual	This design comprises:		
	• A quantitatively-driven core component		
	• A qualitative supplementary component		
	The core and supplemental components are conducted <i>simultaneously</i> .		

If the two components are conducted one after the other, with the core component conducted first followed by the supplementary component, we have a *sequential mixed method design, denoted with an arrow* —>. Possible sequential designs, and their characteristics, appear on Table 2.2.

Of course, these notations may be extended as the design becomes more complex. Some of these variations are discussed in Chapter 10.

When the mixed method design involves qualitative and quantitative components, sampling becomes tricky. For example, if a project is quantitatively-driven (i.e., QUAN), a quantitative method is being used as the core (primary) method and a qualitative supplemental strategy is *used to obtain an enhanced description, understanding, or explanation of the phenomenon under investigation*, then the issue is *sampling* and the researcher must ask questions such as: What will we use for the qualitative sample? Should we select participants from the quantitative sample or draw a separate one? It is often the case Principle #7: Sampling must be compatible with the assumptions belonging to the method or strategy it serves.

Table 2.2	Sequential	mixed	method	designs	and	their	chara	cteris	tics

Sequential mixed method designs	Characteristics of the designs
QUAL—>qual	This design comprises:
	• A qualitatively-driven core component
	• A qualitative supplementary component
	The core and supplemental components are con- ducted <i>sequentially</i> .
QUAL—>quan	This design comprises:
	• A qualitatively-driven core component
	• A quantitative supplementary component
	The core and supplemental components are con- ducted <i>sequentially</i> .
QUAN—>quan	This design comprises:
	• A quantitatively-driven core component
	• A quantitative supplementary component
	The core and supplemental components are con- ducted <i>sequentially</i> .
QUAN—>qual	This design comprises:
	• A quantitatively-driven core component
	• A qualitative supplementary component
	The core and supplemental components are con- ducted <i>sequentially</i> .

Point of interface	Description
Analytical point of interface	• The supplemental component fits into the core component in the analysis of the core data.
	• For instance, with a QUAN + <i>qual</i> design, <i>if</i> the qualitative component meets certain assumptions, data collected by using the <i>qual</i> supplemental strategy may be transformed numerically and incorporated into the QUAN data set of the core component as additional variable(s) and analyzed quantitatively.
	• This integration of data has to be done just before the core data are analyzed.
Results point of interface	• The supplemental component fits into the core component in the results narrative of the core component.
	• Data from the supplemental component are analyzed separately from the core data, and the <i>results</i> from the supplemental strategy are incorp- orated into the findings of the core narrative, informing the findings of the core method.
	• The findings are always written so that the core project results form the theoretical base of the study, and the supplementary findings embellish, detail, and supplement the narrative.

Table 2.3 Core positions of the point of interface

that one sample cannot be adopted *carte blanche* into the supplemental component, so possible alternatives for sampling must be considered.

The position where the supplemental component fits into the core component usually occurs in one of two places: in the analysis of the core data (i.e., the analytic core) or in the results narrative of the core component (see Table 2.3). The conditions necessary for the integration of each supplementary component to the core component and the procedures will be described later (see Chapters 8 and 9).

Examples of Mixed Method Designs

In this section, we discuss examples of various types of mixed method designs, considering the role of the supplemental component (Table 2.4).

Note that each component contributes to the scientific contribution of the project—that is, is directly relevant to answering the research questions. Sometimes a researcher will have to "detour"—conduct a small qualitative project to assist with the *mechanics* of the project (perhaps to determine why refusal to participate is too high and to

Mixed method designs	Supplemental component	Role of the supplemental component
QUAL +/—>qual	qual	• Elicit another perspective or dimension
		• Obtain data that the first method cannot access
QUAL +/—>quan	quan	• Enhance description (how much many, high, fast, loud, etc.)
		• Enable the testing of an emerging conjecture
QUAN +/—>qual	qual	Provide explanation
		• Obtain description that the first method cannot access
QUAN +/—>quan	quan	• Add a second layer of description
		• Provide supplemental evidence

Table 2.4 Role of the supplemental component for the major designs

increase enrollment [Donavan et al., 2002]). Because this detour does not contribute directly to the research question, it does not play a role in the mixed methods project per se. Such projects are incidental to the research, not a part of the design (unless, in this case, your topic is enrollment), and are therefore not, as the authors and Creswell and Plano Clark (2007) have classified, "embedded" in the study.

QUAN + qual Design

This is a simultaneous quantitatively-driven mixed method design, with the point of interface in the analytic core. The core component is measurement or even experimental method design; the supplemental strategy is to provide explanation or to obtain description that the first method cannot access.

An example of such a study may be a survey with 10% of the items written as semistructured open-ended questions to address the quantitative component. The research question was "What are the incidence and severity of untoward effects to participants of unstructured interviews?" Given the wealth of research literature that refers to the use of unstructured interviews and researchers' awareness of potential harm arising from these interviews, the theoretical drive or overall direction of the inquiry is deductive and quantitative.

The sample size of 517 respondents was large for the management of the textual data, yet the transposition of these qualitative data to enable their incorporation into the statistical analysis was not prohibitive, and the inductive qualitative component greatly added to the validity of the overall project and enhanced description, understanding, or explanation of the phenomenon under investigation. For instance, qualitative data were obtained about why some research topics could be labeled as emotionally sensitive topics.

Six response categories for this variable emerged from the data. These data revealed that during interviews, participants recalled feelings about "self issues," "controversial issues," "illness and/or caregiving issues," "mental health issues," "marital and/or parenting issues." For coding all textual responses, it was also necessary to include the following response categories: "Other issues," "More than one of the above," "Not applicable/Difficult to tell/Don't know." A numerical code was then assigned to each response category and this variable was included in the code book for coding of the responses. However, the qualitative responses were also analyzed qualitatively. The loss of detail that occurs with quantitative transposition is costly but must be considered a different type of information provided.

QUAN—>qual Design

This is a quantitatively-driven, sequential, mixed method design. An example of such a study may be a quantitative survey of a neighborhood. Analysis revealed no correlation between working mothers of toddlers and the use of day care facilities. Follow-up qualitative interviews were then conducted with a sample of "good informants" from the QUAN sample. The supplemental qualitative data revealed that many of the fathers in these areas were students with flexible schedules; they organized their schedules to assume care of their children during the day and elected to do their studies in the hours their wives were able to be home. This flexible arrangement for child care had not been anticipated by the researchers, and the subsequent qualitative component was necessary to provide explanation for the unexpected findings.

QUAL + quan Design

This study is qualitatively-driven, with a simultaneous, quantitative supplementary component.

An example of this design may be a study exploring the mutual consolation that occurs between relatives of critically ill patients in the family waiting room. The researcher may observe that the mothers of these patients go forward to the head of the bed, while fathers stay back at the foot of the bed. If we could objectively measure the distance between these parents, the description would be more compelling.

The researcher realized that a "rough" measure of the distances between the parents could be unobtrusively measured by counting the number of floor tiles between them. In this way, the results contributed to the description of the need for mutual consolation between the relatives.

QUAL—>quan Design

This is a qualitatively-driven design with a quantitative sequential supplemental component using a *data collection strategy*.

An example of this study would be to explore the mutual consolation that occurs between relatives of critically ill patients in the family waiting room. The researcher may observe that the relatives are anxious and wish to describe the degree of anxiety manifest by using a standardized anxiety scale (a supplemental data collection strategy). In this way, the scores were obtained separately from the relatives and compared with external norms. The results were added to the description of the need for mutual consolation between the relatives.

QUAL—>quan design

This example is the same design as above, with the exception of *using a supplementary data analysis* strategy.

In our example of relatives waiting, we may observe that those who appear to meditate have less need for the support provided by relatives. In interviews with these relatives, those who are spiritual have spoken of their use of meditation. This information may be quantified by rigorously transforming and coding the data and then conducting nonparametric statistical analyses on the results to determine whether there are significant associations between relevant variables. Note that this data analysis strategy is sequential, because the transformation of the qualitative data cannot be performed until the qualitative analysis is completed and these results inform the research findings rather than building the findings per se.

Sampling Issues for Mixed Methods Design

When the mixed method design involves qualitative and quantitative components, sampling becomes tricky. With a quantitatively-driven, qualitative supplemental design (QUAN-qual), the researcher must consider:

- the quantitative sample is too large for qualitative use (with the exception of qualitative semistructured interview as a method); and
- the quantitative sample has been randomly selected. With the small size of the qualitative sample:
 - If the researcher samples (perhaps randomly) from this sample, it is possible that the qualitative interviews will have very poor and possibly no information that will answer the research question.
 - If the qualitative researcher uses all the quantitative sample, unless she or he is using semistructured interviews, she or he will drown in data. If the studies are conducted sequentially,

it is possible that the sample cannot be located, and not available, anyway.

Conversely, with a qualitatively-driven, quantitative supplemental design (QUAL-quan):

- the qualitative sample is too small for quantitative use (with the exception of small sample non-parametric analysis), and,
- the qualitative sample has been purposefully selected and from a quantitative perspective, is biased.
 - If the quantitative researcher uses this sample, it is possible that the quantitative analysis will be meaningless.
 - If the quantitative researcher measures some dimension in qualitative sample (using it also as the supplementary sample) the results will be useless UNLESS she or he compares these results with norms obtained elsewhere (these are often available with the instrument). As with quantitatively-driven projects, if the studies are conducted sequentially, it is possible that the sample cannot be located, and not available, anyway.

Therefore, where will the quantitative researcher obtain his or her sample?

We will discuss this question of sampling in greater detail later. Meanwhile, think about the problem.

Pitfalls with Mixed Method Design

Although mixed method designs strengthen research by making it more comprehensive, it is not always easy to do. Some common errors make it tricky and may threaten the validity of the entire project:

1. Ignoring the theoretical drive or being unaware of the theoretical drive

Can one have a core and a supplementary component of equal theoretical "weight"—a parallel design, so to speak? Some authors write of *equivalent designs* (Creswell & Plano Clark, 2007). However, if projects have equal weight, what does an "equal weight research question" look like? Are both complete and scientifically rigorous? (If so, one is actually, by definition, conducting multiple method research). How do you write up the findings of these studies—two projects cannot jointly form a theoretical base! Ask yourself, are these two components really representative of around the same phenomenon?

2. Failure to recognize or respect the core component

The core component is the theoretical "base" of the project, which the findings of the supplemental project usually fit into. Failure to recognize which component is the theoretical foundation makes it much more difficult to "write up" the findings as a coherent port on the study. Ignoring which component is the core may also result in sloppy practices when collecting data, and later we will discuss why the core and the supplemental components must be conducted separately.

3. Ignoring the methodological assumptions of the supplementary method

Every research method has its particular quirks that must be respected and followed. If you do not have these assumptions clearly demarcated, it is possible that important assumptions will be overlooked and ignored. For instance, if you have a QUAL-quan design, later, in Chapter 6 we will discuss how to overcome the limitations of the qualitative purposeful sample when conducting the quantitative supplementary component; or, alternatively, how you select a qualitative sample when conducting a quantitatively-driven project with a qualitative supplementary component. Further, if one is conducting a QUAN + qual project and wishes to incorporate the qualitative data into the quantitative data set for analysis, thereby making the supplementary method fit the requirements the core method, techniques of data transformation are essential, and the qualitative data must have a certain form for such transformation to be possible (see Chapter 9).

4. Not conducting an armchair walkthrough

Conducting an armchair walkthrough is deliberately envisioning your project and the alternative designs and all possible outcomes. It is imagining your project step by step, to foresee problems and the advantages and disadvantages of conducting your project using all available alternatives. It enables you, to the best of your ability, to select the design wisely.

Using the armchair walkthrough, smart researchers are able to think through their project to the end result, anticipate the sample needs for each study, the type of data that will be obtained, the methods used and why, how the core and the supplemental components will interface, and what the results will look like. You will be able to see how they will fit at the point of interface, and what your end product will look like. Now—diagram it!

Such smart conceptualizing, putting yourself several steps ahead of the project, while, at the same time, planning (or even working with the data if a supplementary project is going to emerge), is crucial. We spoke of the difficulties of having a grounded theory study in a QUAN-qual design: If you needed the grounded theory, perhaps you should have been doing a singlemethod qualitatively-driven project or should move to a multiple-method project. The lack of theoretical fit between some methods is insurmountable—not only do some methods not fit, they do not make conceptual/theoretical sense either. Mull this over—we will return to it later.

Reading the Flowcharts

Examples of flow charts illustrating types of mixed method designs are included in each chapter describing each particular method (Chapters 8 and 9). Developing flowcharts for each mixed method design allows us explore both the core and the supplementary component clearly, illustrate the pacing, and show where these components meet (interface). Note that the *point of interface* is usually in the core narrative



Figure 2.1 Single method designs

of the results section or, less commonly, in the core data analysis section. Separating each component by providing each with its own pathway in the flowchart helps us manage each data set, understand how they are paced (sequentially or simultaneously), and to note quickly the intricacies of design that needs to be developed (sample/ participants, instruments/interviews or observations, and so forth). Of greater importance, the flowcharts are a constant reminder of the theoretical drive—to be constantly aware if you are working inductively or deductively.

When you come to a flowchart, read it from the top down and you will notice that it is simply the basic research process. For instance, both qualitative and quantitative research projects start with aims and from the aims a research question develops. Next, choose the method that optimally fits the research question. Then select the setting, choose the sample that best answers the question and fits the method, and collect your data. The analysis follows and the results are presented. When presenting a mixed method, we place the core project in the lefthand pathway and the supplemental component in the right.

In Figure 2.1, we illustrate the basic research process using two flow charts to show you how easy they are to read from the top down. We have outlined a quantitative project in the left diagram and qualitative project in the right in Figure 2.1. These are the flowcharts for your basic quantitative and qualitative project, from identifying the research problem, as normally conducted.