

Designs for Mixed Methods Research

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Learning objectives

The purpose of this chapter is to examine design considerations when planning mixed methods studies. After reading this chapter you will have the knowledge to:

- a) Understand the importance of clearly linking the research design to the purpose and question of the study.
- b) Locate mixed methods designs in the context of designing research that is context- and population-sensitive.
- c) Identify various mixed methods design types and related sampling strategies.
- d) Describe key features of commonly used mixed methods research designs.
- e) Understand the rationale for selecting particular mixed methods designs.
- f) Identify design-specific methods that can be used to answer research questions.

Introduction

A wide variety of mixed methods designs has been described in the literature. This stems from the potential for creativity on the part of researchers using this approach. Whilst over 40 designs have been

categorised (Tashakkori and Teddlie 2003), these can be reduced to a few core designs with signature features that clearly distinguish them from one another. In this chapter the characteristics of the common mixed method designs are discussed and the questions that researchers need to consider when using these designs are explored.

The reader is cautioned to carefully consider the rationale for their use of a mixed methods design. There are circumstances where traditional homogeneous research designs may be preferable. Even when the rationale for mixed methods research designs is sound there may be multiple reasons why investigators will choose traditional design approaches. These include a lack of expertise or resources within the research team, stakeholder priorities and dissemination issues (Table 3.1).

Table 3.1 Reasons for choosing mixed methods rather than 'traditional' designs.

Consideration	Explanation
Research purpose	<ul style="list-style-type: none"> • The research purpose and research questions require a combination of qualitative and quantitative methods. • Research questions can be formulated to either provide testable results (quantitative) or to describe and characterise a phenomenon of interest (qualitative) but individually they do not address the primary purpose of the study. • There is insufficient information available in the literature and there is a need for exploratory research.
Research expertise	<ul style="list-style-type: none"> • A team that has expertise in qualitative and quantitative research methods and how to combine them for mixed methods research can be found and are willing to work together collaboratively.
Resources	<ul style="list-style-type: none"> • There is funding available to conduct a multiphase, multimethod study.
Stakeholder priorities	<ul style="list-style-type: none"> • Policymakers want detailed coverage of the problem including the extent (quantitative) or nature (qualitative) of a problem and how they are interrelated.
Dissemination	<ul style="list-style-type: none"> • Journal accepts mixed methods research papers.

Research purpose and design

Research design is concerned with transforming research questions into a framework of strategies and methods that will enable the investigator to systematically answer these questions. The specific strategies and methods used in conducting the research depend on how the research question is formulated. A mixed methods study may have an overarching question that encompasses all aspects of the study, or there may be subquestions which separately guide the qualitative and quantitative components of the data collection.

‘Designing’ research is not simply a process of assembling an array of data collection methods, but rather should be a carefully selected and systematically applied process. Building a house may serve as an analogy. It is not sufficient to acquire all the raw materials needed to build the foundation, erect the frame, construct the walls and install the appliances. The design process requires careful planning of every step in the process, from calculating static to determining how to wire cables and ensuring that doors have sufficient space to open and close. Good design does not only necessitate relevant expertise, it also ensures that timelines are met, and that tasks are undertaken in a logical sequence. For example, the floor will not be put into your new house before the walls are dry.

‘Design deals primarily with aims, purposes, intentions and plans within the practical constraints of location, time, money and availability of staff. It is also very much about style, the architect’s own preferences and ideas (whether innovative or solidly traditional) and the stylistic preferences of those who pay for the work and have to live with the finished results’ (Hakim 1987: 1). In other words, the research design links a research purpose or question to an appropriate method of data collection and a set of specific outcomes. Newman et al. (2003) have devised a typology of research purposes in the social sciences. These include: 1) prediction, 2) adding to knowledge base, 3) personal, social, institutional and/or organisational impact, 4) measurement of change, 5) understanding complex phenomena, 6) testing of new ideas, 7) generation of new ideas, 8) inform constituencies, 9) examine the past. All of these can be achieved within the context of mixed methods research design.

General design elements

As has been addressed in Chapter 2, different paradigms underpin the way that researchers’ believe ‘knowledge’ or ‘evidence’ can be

uncovered or produced. This has immediate implications for the design of mixed methods research. The debate continues whether seemingly different scientific 'world views' are compatible, or not, and to what degree paradigmatic views necessitate design 'purity'. Mixed methods researchers accept that it is possible to combine qualitative and quantitative methods, but maintain congruence with their respective paradigms.

Regardless of specific research orientation, most research studies follow the same general framework, consisting of the elements listed in Table 3.2. Answering the questions in the right-hand column will guide the researcher towards the design options most appropriate for answering their particular research questions.

Planning a mixed methods study

In mixed methods research, quantitative and qualitative methods are combined in the context of one study. While it is important to understand what other terms are in use to describe the combined use of qualitative and quantitative methods, it is equally critical to determine what does not represent a mixed methods study. We need to distinguish studies that simply combine multiple methods in the data collection or multi-informant studies from mixed methods designs. For example, the use of a questionnaire that contains rating scales, categorical answers, as well as open-ended questions, does not automatically constitute a mixed methods study. Similarly, collecting information from different sources, such as a systematic literature review and key informant interviews, does not automatically indicate a mixed methods approach. For the research to be considered a true mixed methods study, there must be genuine 'integration of the data at one or more stages in the process of research' (Creswell et al. 2003: 212).

For example, a researcher may conduct a study of that employs in-depth interviews with general practitioners, family members of people with learning disabilities and individuals with learning disabilities to examine factors that prevent or facilitate access to general health care services for people with learning disabilities. The study results may lead to findings that show that a range of personal, economic, social and environmental factors impede access to services in complex ways. The results may be an impetus to the researcher to explore further issues from the original study, such as determining the magnitude of the problem with access to dental services for persons with a disability. The nursing researcher may collaborate with a professor in dentistry and a sociologist and the new study design may target a random selection of dental practices in the country and use an online survey format

Table 3.2 Research design elements.

Design element	Questions to answer
Purpose and relevance	<ul style="list-style-type: none"> • Why is this research necessary? • What knowledge will be derived from this research? • Is the primary purpose to describe, explore, understand, examine, evaluate or test a phenomenon of interest? • Are there multiple purposes for conducting the study?
Theoretical orientation	<ul style="list-style-type: none"> • Will the study be conducted and analysed within a grounded theory, ethnographic, phenomenological or postpositivist quantitative or pragmatic framework?
Research questions	<ul style="list-style-type: none"> • Does the research question imply a comparison with a different group? • Does the research question imply magnitude, degree, frequency? • Does the research question imply description, contextualisation and understanding from a particular perspective? • Does the research question require a combination of all of the above?
Sampling strategy	<ul style="list-style-type: none"> • Will the sampling be based on a random, selective, purposive or convenience process? or, • Will the sampling require a combination of random and non-random strategies?
Methods of investigation	<ul style="list-style-type: none"> • Will interviews, questionnaires, observations, focus groups or numeric scales and tests be used to answer the research question? or, • Will a combination of data collection methods be used to answer the research question?
Methods of analysis	<ul style="list-style-type: none"> • Will qualitative or quantitative (statistical) methods of analyses be employed separately to answer the research question? or, • Will integrated methods of data analyses be employed?

for data collection. Despite the fact that this second quantitative study has emerged from the first qualitative one it is not a mixed methods study, as the studies were conducted independently, focusing on different research problems and questions and the findings are not integrated.

Having identified that the study will meet the criteria to be defined as mixed methods research the researcher must choose the design. This

is a critical first step and careful attention has to be paid to various planning steps to turn the design into a feasible study. Among the first questions to ask are: 1) Is a mixed methods design appropriate?, and 2) Is a mixed methods design needed? These two questions differ in that the first seeks to establish the scientific appropriateness of a mixed methods design approach. It asks whether the research question as it is formulated can be best answered with mixed methods. The second question examines whether a comprehensive and costly approach such as mixed methods is really needed and whether enough knowledge may already exist in the scientific literature (for example, sufficient quantitative information about the magnitude of an access to care issue) that would suggest a different design choice (for example, a qualitative in-depth study to build a theory about why access difficulties occur).

Effectively designing mixed methods studies not only requires adequate resources (budget, time, software) and expertise (researchers trained in qualitative and quantitative methods and integration of data from both methods) but also the ability to systematically map out the research process (aims, priority, sequence and integration of study parts). Frequently, students are intrigued by the promise they see in mixed methods research. However, they often fail to appreciate the resource implications and expertise required for the conduct of such projects. Additional considerations for research students are discussed in Chapter 12. Some authors have recently discussed the potential for mixed methods designs to be used in multiyear research and development projects involving multiple iterative qualitative and quantitative phases (Schensul et al. 2006; Nastasi et al. 2007) (Box 3.1). In these complex research studies, formative or exploratory research phases are followed by confirmatory and explanatory research phases.

Box 3.1 Research in action

A Sri Lanka Mental Health Promotion Project (SLMHPP) (Nastasi et al. 2007) used a combination of research methods, including focus groups, individual in-depth interviews, key-informant interviews, participant observation, archival material, cultural and historical literature, popular mental health literature and media as well as secondary analyses of existing qualitative and quantitative data to develop culture-specific theory and quantitative psychological self and teacher report measures. The authors contend that 'this mixed methods approach to scale development yielded insights to Sri Lankan youth culture that could not have been obtained with singular approaches' (Nastasi et al. 2007: 174).

Considerations for choosing a mixed methods design

When discussing mixed methods research designs, many authors appear to ignore traditional design features in health and social science research. Robson (2002) distinguishes between 'fixed' and 'flexible' designs. The former is theory-driven and research is conducted to test and hopefully confirm the researcher's theory and hypotheses. Research is mostly conducted under 'controlled' conditions. Flexible designs are mostly 'exploratory' in nature with less control over variables that produce the findings. The strength of mixed methods designs is to balance flexibility of qualitative exploration with the fixed characteristics of theoretical grounding and hypothesis-testing inherent to many quantitative approaches. Mixed methods designs systematically and purposefully combine fixed and flexible design components. The six primary purposes that guide mixed methods research designs are presented in Chapter 4.

Several authors have attempted to provide a classification of the various mixed methods designs (Creswell et al. 2003). While the plethora of terms and designs described in the literature can be confusing, it is important to focus on the research aim and to choose the design most appropriate to answer it. It is important to note that there is currently no standard nomenclature of designs for mixed methods research. Therefore, whilst the most popular design names have been used here, some authors may use slightly different names to describe these designs in their work.

Creswell (2003) proposes four questions that must be addressed by the researcher during the planning stage of mixed methods research:

- In what *sequence* will the qualitative and quantitative data collection be implemented?
- What relative *priority* will be given to the qualitative and quantitative data collection and analysis?
- At what stage of the project will the qualitative and quantitative data be *integrated*?
- Will an overall *theoretical perspective* be used to guide the study?

Implementation sequence

Qualitative and quantitative data can be collected either sequentially or concurrently. In sequential studies one data collection method follows after the other, whereas, in concurrent studies, the qualitative and quantitative data are collected at the same time. The decision about the implementation sequence is determined by the nature of the

research question and the rationale for collecting each dataset. For example, when interviews are intended to provide insight into survey findings they are generally conducted subsequent to the analysis of the survey data (sequentially). However, when qualitative and quantitative data are being collected for confirmation it may be possible to collect the data at the same time (concurrently).

Priority

Another consideration for choosing a design is whether one of the methods (qualitative or quantitative) will have priority or greater emphasis than the other in the study. In other words, priority refers to the relative weight assigned to the qualitative and quantitative research components (Kroll et al. 2005). In exploratory studies, where the concepts, variables and relationships among them are mostly unclear, greater priority is often assigned to qualitative elements that uncover the ‘pool’ of variables and relationships among them that may be subsequently studied quantitatively. On the other hand, in explanatory research where qualitative research is mostly used to substantiate findings generated in a population-level survey, priority is mostly assigned to the quantitative component. Figure 3.1 depicts the various combinations of implementation and priority that can inform mixed methods designs.

Integration

Perhaps the most important, but least discussed, characteristic of mixed methods research is the ‘mixing’ of qualitative and quantitative com-

		Implementation sequence	
		Concurrent	Sequential
Priority	Equal status	QUAL + QUANT	QUANT → QUAL QUAL → QUANT
	Dominant status	QUAL + quant QUANT + qual	QUAL → quant qual → QUANT QUANT → qual quant → QUAL

+ = concurrent; → = sequential; quant/QUANT = quantitative; qual/QUAL = qualitative; QUANT/QUAL = dominant phase.

Figure 3.1 Mixed method design matrix (Andrew and Halcomb 2007). Reprinted with permission from eContent Management Pty Ltd. Adapted from Creswell *et al.* 2003; Johnson & Onwuegbuzie 2004; Morgon 1998; Morse 2003.

ponents. True mixed methods designs include a purposeful integration of qualitative and quantitative methods. Integration can occur at various stages of the research process. Integration preferably happens during the data collection, data analysis and/or data interpretation phases but it may also occur in the discussion section of a report/thesis/journal article. The decision on when and how to integrate the data relates back to the research question, including how it is formulated and whether secondary questions have been stated. It is critical that researchers set out with a clear idea how the different data components inform one another and how they provide distinctive answers to the research questions. Integration must never be an 'afterthought' in that researchers blindly embark on a journey of data collection and then try to make sense of the process. Integration is, in many ways, the pivotal point of mixed methods studies. It is important that researchers reporting mixed methods studies clearly articulate the strategies that have been used to achieve integration to both allow the reader to critique the study and contribute to the scholarly discourse regarding the method.

Theoretical perspective

Mixed methods studies may be underpinned by a theoretical perspective that influences the selection of a particular research design and shapes the research process (Creswell 2003). Theoretical perspectives, such as formalised empirical theories (for example, social cognitive theory (Bandura 1997)), epistemological positions (for example, phenomenology, feminism), social theories (for example, social model of disability (Priestley 2003)), theoretical and practical views about the conduct of research (for example, community-based participatory research (Minkler and Wallerstein 2003)) or theoretical propositions with regard to socio-economic, cultural or lifestyle factors could all be used in varying degrees. Mixed methods designs that are guided by theoretical perspectives are often referred to as transformative designs.

Research designs for mixed methods research

Following consideration of the sequence of data collection, relative priority, process of integration and presence of a theoretical perspective, six primary research designs can be identified (Table 3.3). These designs are divided into two subgroups based on their implementation sequence. The sequential designs include sequential exploratory,

Table 3.3 Mixed methods designs. Creswell et al. (2003) in Tashakkori A. and Teddlie C. (eds.) *Handbook of Mixed Methods in Social and Behavioral Research*, p. 224. Thousand Oaks, California: Sage Publications. Reprinted with permission of Sage Publications.

Design type	Implementation	Priority	Stage of integration	Theoretical perspective
<i>Sequential explanatory</i>	Quantitative followed by qualitative	Usually quantitative but can be qualitative or equal	Interpretation phase	May be present
<i>Sequential exploratory</i>	Qualitative followed by quantitative	Usually qualitative but can be quantitative or equal	Interpretation phase	May be present
<i>Sequential transformative</i>	Either qualitative followed by quantitative or quantitative followed by qualitative	Qualitative, quantitative or equal	Interpretation phase	Definitely present (i.e. conceptual framework, advocacy, empowerment)
<i>Concurrent triangulation</i>	Concurrent collection of quantitative and qualitative	Preferably equal, but can be quantitative or qualitative	Interpretation or analysis phase	May be present
<i>Concurrent nested</i>	Concurrent collection of quantitative and qualitative	Quantitative or qualitative	Analysis phase	May be present
<i>Concurrent transformative</i>	Concurrent collection of quantitative and qualitative	Qualitative, quantitative or equal	Usually analysis phase but can be during the interpretation phase	Definitely present (i.e. conceptual framework, advocacy, empowerment)

sequential explanatory and sequential transformative. The concurrent designs include concurrent triangulation, concurrent nested and concurrent transformative.

Sequential designs

Sequential designs usually involve multiple phases of data collection during which either a qualitative or quantitative data collection method

dominates. The research purpose and the particular set of research questions determine the particular sequence in the data collection.

Sequential explanatory

This design is typically characterised by an initial quantitative phase, which is then followed by a qualitative data collection phase. The two methods are integrated during the interpretation phase. Findings from the qualitative study component are used to explain and contextualise the results from the quantitative study component (Box 3.2).

Box 3.2 Research in action

Neri and Kroll (2003) conducted a study where the two principal research aims were: 1) to identify the proportion of individuals with cerebral palsy, spinal cord injury, multiple sclerosis, or arthritis who report difficulties with accessing and/or utilising needed health care services; 2) to identify reasons for access or utilisation difficulties and the consequences that these may produce.

The quantitative component used a multistage, stratified, probability sampling approach. The survey identified a group of 'access-stressed' individuals who reported substantial problems in accessing and/or using health care services. The qualitative study component focused on this group to examine what specific barriers made access problematic and what consequences resulted from not receiving care when needed. Findings encompassed a broad range of barriers, for example, transportation, facility accessibility, provider disability competence (Scheer et al. 2002) and consequences of unmet access, for example, deterioration of physical functioning; work absenteeism; social isolation (Neri and Kroll 2003).

In our research we used qualitative research to sequentially inform quantitative findings. The study is a good example of how the quantitative study component identified a subpopulation that could be characterised as 'access stressed' (Neri and Kroll 2003). The combination of quantitative and qualitative methods in the context of one study enabled us to determine the magnitude, frequency and distribution of access and utilisation difficulties in this population as well as understand the scope and nature of barriers and consequences from the perspective of the respondents.

Sequential exploratory

This strategy typically consists of an initial phase of qualitative data collection that is followed by quantitative data collection. Findings from both data collection methods are analysed and integrated during an interpretation phase (Box 3.3).

Box 3.3 Research in action

Neri et al. (2005) conducted a study to inform the development of a survey tool that focused on physical activity and secondary conditions after spinal cord injury (SCI) (Ho et al. 2005). This study sought to: 1) understand the motivating and inhibiting factors to physical activity and exercise in people after spinal cord injury, and 2) develop, test and implement a survey tool that examines self-reported physical activity after SCI and its relationship with secondary conditions. In this study, the qualitative (exploratory) data collection preceded the quantitative study component. The focus groups specifically explored barriers and facilitators of exercise. Understanding these factors was critical to inform development of the survey tool, which included items on 'chronic and secondary conditions', 'health risk behaviours', 'hospital and health care utilisation', 'physical functioning', 'exercise activities and patterns', 'rehabilitative therapy', 'wheelchair use', 'community integration', 'self-efficacy' and 'demographics'.

The study conducted by Neri et al. (2005) highlights how the topical focus of the quantitative study component is informed by the exploratory findings from the qualitative component in conjunction with the literature sources. This approach allows for greater involvement or participation of service users and communities in refining study instruments and potentially raises the ecological validity of such tools. While most assessment instruments, whether they are used for clinical examinations, screenings or research activities, are purpose focused, they are rarely developed in collaboration or with input from the target population. Moreover, methods are often applied to other social environments than what they originally have been designed for. For example, the assessment of functional status in a clinical setting as operationalised by the functional independence measure (FIM), which has been adopted by many rehabilitation facilities in the US, may have little utility value in community settings, whereas functional status is influenced by a

myriad of factors that are not captured by the instrument. Functional domains that are of subjective relevance, such as social participation, are not measured by the instrument (see also Ozer and Kroll 2002). A mixed methods approach allows design and calibration of an instrument that measures functional domains that are relevant to the target population in the most accessible and inclusive way.

Sequential transformative

Unlike the sequential exploratory or explanatory design, in sequential transformative designs there is not a predominant implementation sequence. This sequential design is guided by a particular theoretical orientation or advocacy lens (Hanson et al. 2005) and findings are integrated during the interpretation phase (Box 3.4).

Box 3.4 Research in action

Groleau et al. (2007) describe a sequential transformative design of the cultural influences on mental health problems and the advantages to the study of using this design. The study commenced with a quantitative telephone survey of the community which included the General Health Questionnaire. The quantitative phase of the study was followed by qualitative interviews which were theoretically driven. These interviews enabled the researchers to explore the cultural health experiences related to the non-use of mental health facilities by Vietnamese and West Indian participants living in an urban area of Montreal.

Concurrent designs

In concurrent mixed methods research strategies, qualitative and quantitative data are collected, as the name indicates, at the same time or in parallel.

Concurrent triangulation

This design involves a single study containing qualitative and quantitative data collection which is conducted at the same time. The purpose of this type of investigation is to validate the findings generated by each method through evidence produced by the other (Box 3.5).

Box 3.5 Research in action

In their longitudinal study of maternal and child well-being, McAuley et al. (2006) conducted semistructured in-depth interviews with mothers and collected quantitative data using several validated scales (e.g. Parenting Stress Index, Edinburgh Post-Natal Depression Scale (EPDS), Rosenberg Self-Esteem Scale) at the same home visit. The authors identified numerous family stressors in interviews, which were corroborated in the quantitative maternal stress index scales. Similarly, the objective measures (EPDS) addressing emotional well-being that indicated a high level of maternal depression were supported by findings from the interviews, in which mothers reported low energy levels, despondency and anxiety attacks. Other qualitative and quantitative measures regarding well-being, maternal perceptions of child development and social support showed similar convergent findings. The authors note that concurrent use of qualitative and quantitative measures adds to the depth and scope of findings.

Concurrent nested design

The term 'concurrent' indicates that both qualitative and quantitative data are being collected at the same time. However, in concurrent nested studies, one of the methods dominates whilst the other one is embedded, or nested, in it (Box 3.6). The research question to be answered by the embedded method may be of a secondary nature or address a very specific subtopic that is connected with the general research question.

Box 3.6 Research in action

Strasser et al. (2007) conducted a concurrent nested design to explore eating-related distress of advanced male cancer patients and their female partners. The primary method used in the study was focus groups which were attended by patients and their partners with the conduct of these groups and the analysis of the data based on grounded theory (qualitative) techniques. The secondary or nested focus of the study was the differences in patients' and their partners' assessment of the intensity and symptoms and degree of cachexia-related symptoms of eating-related disorders of patients. This secondary information was collected by a structured questionnaire which was completed at the time of the first focus group. The eating-related distress differed for patients and their partners as indicated in the qualitative findings, and this was complemented by the quantitative findings.

Concurrent transformative design

Unlike a sequential transformative design, in a concurrent transformative design both the qualitative and quantitative data are collected at the same time. The conduct of the study is informed by a theoretical perspective and data are integrated during the interpretation phase (Box 3.7).

Box 3.7 Research in action

Anastario and Schmalzbauer (2007) used a concurrent transformative mixed methods design in their cultural anthropological study of time allocation of Honduran immigrants. They used a time diary to examine gender variations among 34 Honduran immigrants in the time they spend on personal (e.g. commuting) and interpersonal responsibilities (e.g. care work, family). The study was guided by a participatory ethnographic philosophy. Observations and reported activities were quantitatively analysed for respondent-level reliability. The authors conclude that a better understanding of gender differences in time allocation for responsibilities will be critical to inform knowledge about health outcome disparities.

Some additional designs

There are additional research designs such as ethnography, case study, evaluation studies and action research that may use qualitative and quantitative methods in the one study. Moreover, some research identified as using case study, evaluation or action research, could also be categorised into one of the six designs identified as common to mixed methods research. Additionally, case study and evaluation studies may not be linked to a specific paradigm and therefore could be encompassed under a pragmatic paradigm. Rosenberg and Yates (2007), for example, view case study as a method (and not a methodology) that is 'pragmatically – rather than paradigmatically – driven' (p. 448), which clearly places this design as underpinned by pragmatism and therefore under the mixed methods research umbrella. As a number of case studies is undertaken for the purpose of evaluation this may apply to evaluation studies. Similarly, action research and ethnographic studies that utilise mixed methods in their data collection may be aligned to mixed methods research. More debate is required about the positioning of the many other types of designs that integrate qualitative and quantitative methods in their research design.

Data collection methods

Designs are often equated with methods. However, it is important to distinguish clearly between the features of the research design and the methods that populate a design with data. Both design and method are linked to the research purpose, and more specifically to the research question. Generally, multiple methods of data collection can find application within a particular design. Interviews, observational methods, document analyses, physiological measures can be used in the context of experimental, longitudinal, case control or cross-sectional designs. However, the research question determines *how* they are used and in *what way* the data generated by these methods will provide answers.

As has been demonstrated throughout this chapter, it is important that the choice of method(s) is appropriate to address the specific study questions. In fact, the research objective, research questions, design and choice of method need to follow a consistent rationale, and data collection and analysis need to be realistic and feasible considering time and resources available.

Future developments

Mixed methods designs clearly have significant potential to facilitate the development of knowledge in nursing and the health sciences. However, while currently mixed methods designs are understood as a combination of qualitative and quantitative methods it may well be extended to other methodological combinations within one particular study. Equally thinkable are QUAN–QUAN–QUAL studies or QUAL–QUAL–QUAN studies (Box 3.8).

For example, a rehabilitation researcher may struggle with an underpowered randomised controlled study that produced no significant differences between an intervention and a control group. However, upon examination the researcher may find that some of the cases in the intervention group are interesting 'outliers'. These may be followed up longitudinally within a single subject case study producing additional quantitative data and in-depth qualitative interviews to explore the mechanisms underlying their behaviour even further. Similarly, a meta-synthesis may provide a good understanding of a phenomenon based on the interpretation of qualitative research findings from multiple studies, which in turn may be followed an in-depth qualitative exploration of additional topics. Findings from the primary data collection effort may strengthen interpretations of the original meta-synthesis and may then lead to the formulation of quantitative survey items.

Box 3.8 Research in action

Gulmans et al. (2007) discuss the potential for a multiphase evaluation study of patient care communication in integrated care settings using a sequential three-step mixed design (QUAN–QUAL–QUAL). Integrated care settings typically involve multiple professions and multidirectional communication links with which the patient has to interact. Patients hold specific expectations with regard to care settings. A quality gap arises when these expectations are not met, and the experiences differ. Care pathways and the number of communication links between patient and health professionals differ in complexity for various conditions (e.g. stroke, diabetes). In a first step, the authors suggest conducting a quality evaluation of communication from the perspective of the service user using a tailored questionnaire to identify potential quality gaps (QUAN). In-depth interviews (QUAL) with a subset of patients will then be used to illuminate the mechanisms that may be responsible for the mismatch between expectancies and experiences. The final evaluation step involves focus groups with health care professionals (QUAL) to examine findings from the previous two steps, to add the professional viewpoint and to identify solutions to close the quality gap.

Conclusion

It is evident that many current national health research priorities favour mixed methods designs. The UK's Medical Research Council's Framework for the Design and Evaluation of Complex Health Interventions (Campbell et al. 2007) builds on a phased approach. In the pre-experimental stages there is sufficient scope for exploratory work that draws on mixed methods and at the trial stage, qualitative study components may complement findings from the clinical experimental testing. The application of mixed methods designs as part of multiyear research and development projects, described earlier, may be reflective of such a phased approach (Nastasi et al. 2007).

In the scientific literature there has been a steady increase in the volume of mixed methods research published over the past decade and this trend is likely to continue. The field will probably continue to mature in terms of designs and integration practice. Mixed methods designs are also increasingly taught as part of curricula in research methods courses. The growing popularity of mixed methods research is reflected in the increasing number of higher degree research theses that employ these methods. Care needs to be taken, however, to ensure

that scholarly discourse is undertaken to facilitate the development of rigorous methodological frameworks to support the creativity of mixed methods research.

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