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29. Mixed Methods Involving Qualitative Research

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29. Mixed Methods Involving Qualitative Research

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Introduction

Mixed methods research has been discussed in social research for many years (Brannen, 1992b; Bryman, 1988; Sieber, 1973), but there has recently been renewed interest (Bryman, 2006a; Creswell and Plano-Clark, 2007; Tashakkori and Teddlie, 2003). Health researchers have contributed to these methodological discussions with input from a range of specialisms, including qualitative research (Morgan, 1998; Morse, 1991; 2005), nursing research (Sandelowski, 2000; Wendler, 2001), public health (Baum, 1995), health promotion and education (Milburn et al., 1995; Steckler et al., 1992) and health services research (Adamson, 2005; Barbour, 1999; Johnstone, 2004; O'Cathain and Thomas, 2006).

Mixed methods research is defined as 'integrating quantitative and qualitative data collection and analysis in a single study or a program of inquiry' (Creswell et al., 2004). Bryman (1992) distinguishes between integrating research, where two methods produce two sets of data, and integrating data, where a single method produces both quantitative and qualitative data. For example, Bryman would not consider a survey with closed and open-ended questions to be a genuine combination of quantitative and qualitative research, because it does not reflect the strengths of the different methods (Bryman, 1992).

In this chapter, the first issue considered is the debate about whether researchers can combine qualitative and quantitative methods. I then examine why health researchers undertake mixed methods research, the ways in which methods can be combined,

how such studies can be written up, and how their quality can [p. 576 ↓] be assessed. Finally, I consider future directions for mixed methods research in health, picking up on some issues which can have a significant effect on research but that tend not to receive much attention in the literature. The chapter is shaped by my background as a health services researcher in the United Kingdom where quantitative research has historically been dominant.

Can Qualitative and Quantitative Research be Combined?

There is a well-established argument concerning the incommensurability of qualitative and quantitative research – that quantitative methods are associated with positivism and qualitative methods with interpretivism, so that it is not possible to combine paradigms and, by association, methods (Smith and Heshusius, 1986). Bryman (1988) took issue with this position, objecting that qualitative and quantitative methods are not exclusively associated with different philosophical paradigms. It is, then, possible to combine them. Researchers associated with the incommensurability position have come to agree: they have recently claimed that their view that *philosophical* paradigms are incommensurable has been misinterpreted as implying that *methods* are incommensurable. They claim that mixed methods research *within* paradigms has always been acceptable, and are now even willing to accept that some of the range of current paradigms may be commensurable (Guba and Lincoln, 2005).

Concerns about paradigm incommensurability can result in researchers struggling to find a philosophical stance when undertaking mixed methods research. One solution is simply to ignore the problem and adopt a pragmatic approach, using whatever seems to work in relation to any particular research question (Bryman, 2006b; O'Cathain et al., 2007b). This should not be confused with adopting a pragmatist approach, based on traditions in American philosophy that have provided a basis for a number of social constructionist paradigms in social science (Morgan, 2007). Pragmatic health researchers tend to be relatively indifferent to questions of ontology and epistemology. However, these cannot ultimately be avoided if researchers are to develop plausible arguments to justify how they can claim to know what they claim to know. In recent

years, a variant on classic pragmatism – ‘subtle realism’ – has become increasingly influential. Subtle realism acknowledges that there is an external reality but that we can only ever know this through human observations that are unavoidably partial and uncertain. This means that any knowledge claims are also necessarily uncertain and that there is a possibility of multiple noncompeting views of any aspect of the social world that is being studied (Hammersley, 1992). Subtle realism can accommodate both qualitative and quantitative methods, requiring a reflexive approach to both components in a study. Alternatively, researchers can choose to adopt different paradigms for different components within a study and use the resulting tensions as an opportunity to better understand the phenomenon being researched (Greene and Caracelli, 2003). This may be challenging for the individual mixed [p. 577 ↓] methods researcher as they shift between different value sets, and for researchers working in teams who may find that their colleagues have different beliefs and values about the meaning of research and how best to undertake it.

Why do Health Researchers Undertake Mixed Methods Research?

Researchers who believe that it is possible to combine qualitative and quantitative methods offer a range of justifications for using mixed methods research (O’Cathain and Thomas, 2006). A key justification is that of *comprehensiveness*, where using both qualitative and quantitative methods allows an issue to be addressed more widely and more completely because of the strengths of different methods (Morse, 2003). Comprehensiveness is a common justification for using mixed methods within health research, because researchers consider that the complexity of health, health care, and the environment in which health research is undertaken, requires the use of both qualitative and quantitative methods (O’Cathain et al., 2007b). An example might be an ethnographic study undertaken alongside a randomized controlled trial when investigating the use of evidence-based leaflets for promoting informed choice in maternity care – the randomized controlled trial was undertaken to measure the effectiveness of the intervention in delivering informed choice (O’Cathain et al., 2002) and the ethnographic study was undertaken to gain a better understanding of the

practice of informed choice and the way in which the intervention was delivered in the real world (Stapleton et al., 2002). Another example is an interview survey of 400 adults who were asked to keep diaries of their health problems and health care seeking behaviour, followed by in-depth interviews with deviant cases from the survey analysis to explore patterns of use of primary care (Rogers and Nicolaas, 1998). The authors discuss how the mixed methods approach gave a broader understanding of the dynamics of health care use, with the survey showing the extent to which people used self care in relation to primary care services, while the qualitative component illuminated the ways in which past experience and domestic context affected decision making (Rogers and Nicolaas, 1998).

A second justification is that mixed methods research can increase *confidence* in findings when the results from two different methods agree, thereby increasing validity (Glik et al., 1986). The term 'triangulation' is often applied in this context but researchers have expressed concerns about the confusion that can result because this term can also be used to describe the process of comparing findings from different methods in order to explore different perspectives of a phenomenon, that is, with a meaning of *comprehensiveness* (Sandelowski, 1995). For this reason, I will avoid the use of the term altogether within this chapter. Returning to the combination of qualitative and quantitative methods to seek convergence of findings, this justification has been much discussed in the [p. 578 ↓] literature on mixed methods research, but has also been heavily criticized. Barbour (1999) and Murphy et al. (1998) discuss these criticisms in the context of health research, including concerns that convergence may be present due to shared bias between methods, and the difficulty of determining which method has given the 'right answer' if they disagree. There is little evidence that this justification is used for combining methods in health services research (O'Cathain et al., 2007b).

A third justification is *development* or *facilitation*, where one method guides the sampling, data collection or analysis of the other (Sandelowski, 2000). An example of this is a postal survey of 800 women with heavy periods followed by in-depth interviews with 32 of the survey respondents to explore women's management of menstrual symptoms, where the survey was used to facilitate sampling for the qualitative component of the study (Santer et al., 2008).

Finally, mixed methods research may be used for the purpose of *emancipation*, where the use of a variety of methods ensures that marginalized voices are heard (Mertens, 2003). This justification may be particularly pertinent to researchers in health promotion, or to those undertaking action research. Health services researchers who tend not to use mixed methods research with this intent have nonetheless noted the power of qualitative research to bring the voice of the patient and health professional into a research study (O'Cathain et al., 2007b).

When mixed methods research is used for comprehensiveness, one could argue that the qualitative and quantitative components could be undertaken independently by different research teams rather than within the same study. In the example of the leaflets in maternity care, the randomized controlled trial could have been undertaken in different maternity units at a different time by different researchers than the ethnographic study. Researchers may undertake the qualitative and quantitative components together, because it seems more convenient or efficient to do so, or because they believe that mixed methods studies can produce more knowledge than two independent qualitative and quantitative studies, that is, 'a whole greater than the sum of the parts' (Barbour, 1999; Teddlie and Tashakkori, 2003). This extra knowledge or insight has been termed 'yield', and researchers have been challenged to show what mixed methods research contributes over and above the knowledge that might be gained from undertaking a qualitative study and a quantitative study independently (O'Cathain et al., 2007a).

The motivations for adopting a mixed methods approach may not always be based on the intrinsic value of mixed methods research for addressing a research question: they may also be strategic (Bryman, 2007; O'Cathain et al., 2007b). Researchers may combine methods to increase their chances of funding, or to facilitate dissemination of their research. They may also be driven by a belief that this approach is inherently A Good Thing. Researchers may, however, find themselves floundering if they have not thought through exactly why this approach is appropriate to their research question.

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Types of Mixed Methods Studies

Having considered why health researchers might combine qualitative and quantitative methods within a study, I now turn to the different types of mixed methods studies that can be undertaken. Much attention has been paid to developing typologies of mixed methods designs (Creswell et al., 2003; Tashakkori and Teddlie, 1998), including their use in health research (Morgan, 1998). Morgan describes four designs based on the dominance of either the qualitative or quantitative component, with the assumption that methods will be undertaken in sequence, for example 'quantitative preliminary' and 'qualitative follow-up'. Such typologies are useful for introducing researchers to the range of designs available for use, and have been summarized and discussed elsewhere (Creswell and Plano-Clark, 2007). There is, however, no dominant model, and a typology's relevance may depend on the research objective – for example, a number of typologies exist for evaluation. Rather than discussing any one typology in detail, it seems more useful to consider key aspects of mixed method study design, including the purpose of combining methods (Greene et al., 1989), the priority and sequence of mixing (Morgan, 1998), and the integration between methods (Sandelowski, 2000).

Purpose of combining methods

Greene et al. (1989) describe a number of reasons why methods might be combined. These resemble the justifications for undertaking mixed methods research outlined earlier: *complementarity* where two methods are used to assess different aspects of a research question and the findings from one method used to elaborate or explain the findings of the other method; *confirmation* where the findings from two different methods are compared and agreement is sought; and *development* where one method is used explicitly to assist another. Two methods may be combined with more than one purpose in mind, particularly to achieve both complementarity and development.

Priority and sequence of methods

The priority and sequence of methods can be used to distinguish different mixed methods designs (Morgan, 1998). Priority denotes whether one method is dominant, in terms of being the main focus of the study. An example of a 'quantitative dominant' approach is where qualitative interviews or focus groups are undertaken prior to a survey to generate items and language for the structured questionnaire; the qualitative component is considered to be a means of ensuring that the questionnaire is both relevant and comprehensible to potential respondents. An example of a 'qualitative dominant' approach is a survey undertaken prior to in-depth case studies or interviews to identify context and a sampling frame for the qualitative component. These 'dominant' designs can be undertaken [p. 580 ↓] in such a way that they really fall outside the definition of mixed methods research, which requires recognition of both qualitative and quantitative methods. A subordinate qualitative component may not be formally analyzed and reported but used merely to offer a few illustrative quotes to a survey, or a subordinate survey used to support sampling for a qualitative component may pay little attention to strict probability criteria. We also find equal partnerships, where each method contributes to knowledge development in its own right rather than one method simply facilitating the other. The examples of 'survey and interview' combinations introduced earlier in the chapter represent this latter type (Rogers and Nicolaas, 1998; Santer et al., 2008). Even though the quantitative component produced a sampling frame for the qualitative component, a sophisticated analysis of both components was reported (Rogers and Nicolaas, 1998).

Methods can be undertaken sequentially, concurrently, or iteratively. Morgan's typology is limited to sequential designs. The strength of this approach is that researchers build into their design the impact of one method on another: for example, interviews with survey respondents might help to explain surprising survey results. Concurrent designs are frequently used in health research (O'Cathain et al., 2007b). These can be more problematic when it comes to integration between methods, because this is not explicitly built into the design. In iterative designs, a qualitative method might be undertaken first to generate hypotheses, which are then tested using a quantitative method, with

any unusual findings from the quantitative method followed up in further qualitative investigation.

Integration

Finally, researchers need to consider when and how links will be made between methods within a study (Sandelowski, 2000). As discussed in the foregoing section, this may be built in to some designs more than others, particularly sequential designs. A common approach to integration is to bring the findings from both methods together, comparing and contrasting them to see if further understanding can be gained. Not a *priori* assumption of convergence is needed when doing this, and apparent contradictions between findings – called ‘inter-method discrepancy’ – may lead to further valuable insights about the issue under study (Fielding and Fielding, 1986). Alternatively, integration can happen earlier in a study, where the findings of one method affect how the other method is analyzed. For example, a typology might be identified in the qualitative component which can then be used within the analysis of the quantitative data. There is also scope for the raw data from the qualitative and quantitative components to be brought together during analysis. For example, the questionnaire and interview transcript for an individual can be compared to identify patterns that can then be traced through other cases included in both the qualitative and quantitative components of a study. This may involve ‘quantitizing’ qualitative data, that is, assigning codes to the presence and absence of themes within individual cases [p. 581 ↓] (Sandelowski, 2000). Matrices have been promoted as a way of displaying qualitative and quantitative data on the same cases in mixed methods studies (Creswell and Plano-Clark, 2007; Wendler, 2001). Integration can also take place at the sampling stage of a study, where key variables in a survey, or the findings of the survey analysis, are used to identify people for qualitative interviews or case studies.

While integration is a key aspect of mixed methods research (Creswell et al., 2004), its absence has been noted in mixed methods studies within UK health services research (O’Cathain et al., 2007a). Bryman (2007) considered the barriers to integration in mixed methods studies in UK social research, noting the differing timelines of methods, and the skills and preferences of researchers. Although there are barriers to integration,

researchers need to address these if the potential of mixed methods is to be fully exploited.

Contexts

Some design types are more likely to be used in some contexts than others are. Three contexts are relevant to health research. First, the exploration of health issues using a combination of survey and fieldwork. This combination is commonly used in social research (Bryman, 2006a) and will often involve a sequential design. Second, the development of standardized instruments to measure health status and patient satisfaction. Researchers tend to use focus groups or interviews with patients to generate items for inclusion in a new measure, using a sequential quantitative dominant design. However, some researchers exploit the strength of the qualitative component by undertaking a full and sophisticated qualitative analysis to understand the underlying concepts of the health issue under study. When developing an instrument to measure patients' views of the interface between primary and secondary care, the qualitative research identified the sense of being 'left in limbo' underlying this experience of health care use (Preston et al., 1999). Third, mixed methods research has been used extensively in the context of evaluation (Greene et al., 1989; McConney et al., 2002), including evaluation of health technologies (Murphy et al., 1998) and complex interventions. Quantitative dominant designs have been promoted, with randomized controlled trials as the priority component, and qualitative research employed to better understand how the intervention might work, improve how the intervention is delivered in practice during the early phases of research, and explore how it is used in the real world (Campbell et al., 2007). Concurrent designs are common in evaluation, with qualitative methods used within a process evaluation undertaken alongside an experimental design such as a randomized controlled trial, or controlled before and after study, to study how an intervention works in the real world (Oakley et al., 2006). An excellent example of this is a qualitative study undertaken concurrently with a pilot trial which helped to optimize an intervention to support people with a diagnosis of myocardial infarction or angina (Bradley et al., 1999).

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Reporting Mixed Methods Research

Once researchers have designed and implemented their mixed methods research, they need to consider how to report it. This can be a challenging aspect of mixed methods research (Bryman, 2006a; Johnstone, 2004; Sandelowski, 2003) in the context of writing final reports for funding bodies, books, dissertations, theses, and peer-reviewed journal articles. Researchers can struggle with the order of presentation of different methods, the voice to use throughout the report, and the format of presentation (O'Cathain, 2009).

The order of presentation, in terms of whether researchers report the qualitative or quantitative research first, may be dictated by the order in which methods are undertaken in sequential mixed methods designs. Methods undertaken concurrently present more of a challenge. In this case, the order may depend on the story the researchers wish to present, and, indeed, this may also be the case for sequential studies because of the nonsequential interplay between sampling, data collection, analysis, and write up of different study components.

Qualitative research can be reported using the first person whereas it is usual to report quantitative research in the third person. Therefore, researchers may face a quandary about the voice to use in a mixed methods study (Johnstone, 2004; Sandelowski, 2003). They might choose a single voice associated with the dominant component of their study, their philosophical stance, or the voice most accepted within their research community. An alternative approach is to use two voices – the first person for the qualitative and the third person for the quantitative method. This will still leave the researcher with a decision to be made about the voice of the joint or integrated parts, such as the introduction and discussion of a report.

Finally, researchers can choose to take either a segregated or integrated approach to reporting their study (O'Cathain, 2009). The former approach is where the methods, results, and sometimes the discussion, are reported separately for each component. The latter is where the qualitative and quantitative methods are reported in the same chapter; results are reported in chapters based on themes from the research and each theme draws on the findings of both the qualitative and quantitative research; and the

study findings are discussed as a whole in the final discussion chapter. Santer et al. (2008) take an integrated approach to reporting their mixed methods study in a journal article. A segregated approach to reporting studies may be easier for the researcher but an integrated approach allows for explicit attention to the overall design of a study as well as the individual methods, and may encourage integration between data and findings from different methods.

Peer reviewed journal articles

It is worth paying special attention to peer-reviewed journal articles because of the added challenge of word limits. Journal editors have recently considered how [p. 583 ↓] researchers can publish mixed methods studies in peer reviewed journals (Creswell and Tashakkori, 2007a; Stange et al., 2006). Researchers can attempt to publish all or some part of their study in a mixed methods article which reports the methods and results of both the qualitative and quantitative research. Bryman (2006a) found over 200 mixed methods articles in social research, a number in health journals. Creswell and Tashakkori (2007a) offer advice on how best to construct such articles if researchers wish to contribute to the development of mixed methodology as well as report the substantive findings of their study.

Not all mixed methods studies are published as mixed methods articles. Stange et al. (2006) detail the range of approaches available to researchers. One approach is to publish the qualitative component of a study in one article and the quantitative component in another (Stange et al., 2006). These can be reported side by side in the same journal (O'Cathain et al., 2002; Stapleton et al., 2002) offering the reader of the hard copy of the journal the chance to consider two pieces of a jigsaw together. Studies can also be broken up into methodological pieces and each piece can be published in different journals at different times. If these sets of papers make no reference to each other then they appear to have emerged from a number of mono-method studies (O'Cathain et al., 2007a). Separate publications of different study components can be used to great effect if the study component addressed in one paper explicitly considers the influence on context, analysis, or interpretation of the component described in another paper. Unfortunately, it may also be the case that some components of a study

are never published (O'Cathain et al., 2007a), leaving mixed methods studies less than the sum of their parts.

Assessing Quality

Once a study has been reported, commissioners, users of research and researchers themselves, need to judge whether a mixed methods study has been undertaken well or poorly. The quality of mixed methods research has been given some consideration (Caracelli and Riggan, 1994; Dellinger and Leech, 2007; O'Cathain et al., 2008a; Sale and Brazil, 2004), but there are no agreed assessment criteria (Creswell and Plano-Clark, 2007).

Researchers have attempted to develop quality criteria for mixed methods studies by devising separate lists for the quantitative and the qualitative elements (Sale and Brazil, 2004). Their assumption is that methods are linked to paradigms so that the criteria used to assess different methods should also be linked to paradigms. Criteria for qualitative research address the goals of credibility, transferability, and dependability; those for quantitative research address internal validity, external validity, and reliability. However, not everyone agrees that different criteria are needed for qualitative and quantitative research. The same criteria of validity and relevance are appropriate for both, although the means for judging against these criteria may differ because of the research practices employed in different methodological approaches (Murphy et al., 1998).

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This 'individual methods' approach is very useful, but it ignores the fact that within a mixed methods study, consideration need also be given to the design, integration between methods, and overall inferences. A mixed methods design may not be appropriate for the research question in hand, or may be undertaken in a way which invalidates a key aspect of the design. Attempts have been made to develop quality criteria which address the whole mixed methods study rather than simply the individual methods. Caracelli and Riggan (1994) consider a range of issues relevant to combining methods, for example whether data transformations are defensible, contradictory

findings are explained, and convergent findings are not related to shared bias between methods (Caracelli and Riggin, 1994). Teddlie and Tashakkori (2009) introduce new terms to help researchers consider the 'inference quality' of the whole study: 'data quality' for the degree to which the most appropriate procedures have been used to address the research question and 'interpretive rigour' for the degree to which credible interpretations have been made of the study results. Dellinger and Leech (2007) focus on the validity of a mixed methods study by presenting the 'validation framework' which includes the quality of the overall design, the validity of different aspects of the design such as how 'sampling integration' was undertaken, and the rigour of interpretation of the findings.

Discussions on how to assess the quality of mixed methods studies are continuing. Quality criteria may depend on researchers' philosophical and political paradigms, and on the type of mixed methods study (Bryman, 2006b). It is unlikely that any one set of criteria will suit all researchers or studies. An attempt has been made to devise a set of 'quality questions' about mixed methods research in one specialism of health research and apply them to the proposals and reports of 75 studies (O'Cathain et al., 2008a). The quality questions addressed whether a study had been completed successfully, and the quality of the individual components, the design, the integration and the inferences. The conclusions were that this particular health research community could improve their mixed methods studies by giving more consideration to describing and justifying the design, being transparent about the qualitative component, and attempting more integration between data and findings from the individual components.

Future Directions

It is likely that there will be increasing use of mixed methods research over coming years, and that more attention will be paid to the methodology of this approach. There is scope for further development of techniques to facilitate integration between methods, and exploration of the meaning of the quality of mixed methods research. There are also issues which tend to receive little attention in the literature on mixed methods research and which deserve consideration in the future.

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Training in mixed methods research

Working between qualitative and quantitative data sets requires particular skills, an understanding of the techniques which can facilitate this process, and the epistemological considerations involved (Mason, 1994). Yet, how many researchers have learnt about how to combine methods in either their undergraduate or postgraduate training? If mixed methods research is to be undertaken well, then training early career researchers must be a priority. It is essential that postgraduate courses in research methods explicitly address mixed methodology, and consider innovative ways of doing so (Onwuegbuzie and Leech, 2005).

Interdisciplinary team working

A single researcher may undertake both the qualitative and quantitative methods in a study. In larger studies, it will more likely be a team effort. Teams may be made up of qualitative researchers only, who conduct the quantitative as well as the qualitative component (Brannen, 1992a). Alternatively, there may be researchers from different disciplines, each providing a component of the study. Qualitative researchers may find themselves working on teams where they are the only qualitative researcher, or they are part of a group of qualitative researchers on a larger team. The way in which qualitative and quantitative researchers work together within a team can affect the level of integration which occurs within a study (O'Cathain et al., 2008b). In future, more consideration needs to be given to developing researchers' understanding of team dynamics and their respect for different methodologies, and to training principal investigators to be willing and able to promote integration within a mixed methods study.

Summary and Conclusion

Mixed methods research is commonly used in health research to offer a more comprehensive understanding of a health issue. A range of mixed methods designs are useful within health research and progress is being made on understanding how these

types of studies can be reported and their quality assessed. Future challenges require more attention to be paid to training health researchers in mixed methods research, acknowledging the importance of team dynamics on research outputs, and keeping up with the rapidly expanding methodological developments in this area.

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