

**Exploiting the potential of mixed methods
studies in health services research**

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Abstract

Mixed methods studies, where qualitative and quantitative methods are used together in a single study, are undertaken in health services research (HSR). The question addressed here is whether researchers in HSR are fully exploiting the potential of mixed methods studies, and if not, then how they might maximise the potential of this approach. Methods used to examine this question included a review of the literature on mixed methods research; a quantitative documentary analysis of the research proposals, reports and publications of 75 mixed methods studies funded by ten Department of Health programmes in the period 1994 – 2004; and a qualitative study involving semi-structured face-to-face interviews with 20 researchers.

It was evident from the documentary analysis that researchers are mixing methods in a range of different ways, with quantitative methods dominating, thus reflecting the conventional hierarchy of evidence in HSR. However, researchers could further exploit this approach by being clear about the purpose and practice of mixing methods when planning their studies, exploiting the contribution of qualitative components of studies, engaging with a wider range of ways of integrating data and findings from different components of a study, and being explicit in peer-reviewed journal articles about any unique contribution made by this approach. Findings from the interviews with researchers suggest that researchers can contribute to fully exploiting the potential of mixed methods research by learning more about the different ways of integrating data and findings, respecting and understanding the strengths of the different methodological approaches, communicating with team members, and valuing integration.

In HSR a multidisciplinary approach to team working is the norm whereby study components are undertaken separately. An interdisciplinary approach to team working is less common but may be associated with exploiting more of the potential of mixed methods studies. The external research environment appears to be conducive to interdisciplinary endeavour but not to interdisciplinary outputs. Structural change, as well as change in researcher behaviour, will be necessary if health services researchers are to fully exploit the potential of using mixed methods research.

Chapter 1 Introduction

1.1 The history of mixed methods in health services research

Health services research is a field of research concerned with the demand for, and evaluation of, health services. The American Academy for Health Services Research and Health Policy define it as:

“the multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviours affect access to health care, the quality and cost of health care, and ultimately our health and well-being. Its research domains are individuals, families, organisations, institutions, communities, and populations.” (AcademyHealth, 2000)

Historically, health services researchers in the United Kingdom (UK) have used quantitative methodology to evaluate health technologies such as drugs and services, with the randomised controlled trial (RCT) employed as the gold standard. However, in recent years there has been growing recognition of the complexity of health services and the need for a range of methodologies to evaluate complex interventions (Bradley et al., 1999; Campbell et al., 2000; Ong, 1993; Pope & Mays, 1995). Health services researchers have encouraged the use of qualitative methods within pilot randomised controlled trials (Bradley et al., 1999), within an iterative phased approach to trials (Campbell et al., 2000), and within contextual evaluations undertaken alongside trials (Wolff, 2001). There has also been a growing recognition of the importance of understanding the impact of the delivery and organisation of health services, with a focus on processes as well as outcomes, and the range of methodological approaches required to do this (Fulop et al., 2001).

In the past decade health services researchers have welcomed qualitative methodology, detailing the contribution it can make to health research (Pope & Mays, 1995). As well as studies based solely on qualitative methods, it is not uncommon to make use of both qualitative and quantitative methods within the same study and there are many examples of these combinations emerging in the health research literature (See Box 1.1). The terminology applied to the approach of using both qualitative and quantitative methods within the same study is ‘multi-method’, ‘mixed methods’ or ‘multiple methods’ (Stecher & Borko, 2002). Although these ‘mixed methods’ studies appear to be in the minority in health research – less than 3% in the context of chronic disease research (Casebeer & Verhoef, 1997) and only 1% of high quality clinically relevant publications in 170 clinical journals in the year 2000 (McKibbon & Gadd, 2004) – their use is considered to be growing exponentially in health research in the United States (Forthofer, 2003).

There is a considerable body of knowledge about mixed methods research, discussing why this approach is used, how it can be used, and highlighting the challenges of using it in practice (Brannen, 1992a; Bryman, 1988; Tashakkori & Teddlie, 2003). Although health researchers have contributed to this literature (Barbour, 1999), a substantial amount exists in the fields of social, educational and behavioural research. There is a need to review literature in these fields to identify the range of issues important within mixed methods research of relevance to health services research. Further, although health services researchers have welcomed qualitative methodology into HSR and are using combinations of qualitative and quantitative methods in their studies, they may not be exploiting the full potential of mixed methods research in HSR by drawing on the full range of combinations available, or by using these combinations to a high standard. There may also be facilitators and barriers to exploiting the full potential of mixed methods studies in HSR. There is a need to consider whether researchers are exploiting the full potential of using a mixed methods approach within studies in HSR and the actions that may be necessary to promote further exploitation.

Box 1.1 Examples of studies using both qualitative and quantitative methods published in the BMJ in 2002 and 2003

Ethnographic study (Stapleton et al., 2002) undertaken alongside a cluster randomised controlled trial of the effectiveness of evidence-based leaflets in promoting informed choice in maternity care (O'Cathain et al., 2002)

Epidemiological analysis undertaken on data collected through anthropological study and interpreted alongside anthropological data and a large epidemiological dataset of consumer demand for caesarean sections (Behaque et al., 2002)

Questionnaire used to investigate knowledge of impaired glucose intolerance and as a stimulant for discussion within semi-structured interviews and focus groups (Wylie et al., 2002)

In depth interviews used to explore the process and impact of mergers of NHS Trusts, and audited accounts used to compare trusts which have merged with control trusts to identify cost savings (Fulop et al., 2002)

Questionnaire to determine level of support for a trial, and focus groups to identify solutions to ethical issues associated with the trial (Koops & Lindley, 2002)

In depth interviews undertaken with patients participating in a randomised controlled trial and comparison made between outcomes of both for each individual (Campbell et al., 2003)

Qualitative interview study (Rousseau et al., 2003) undertaken alongside a pragmatic randomised controlled trial of computerised guidelines in primary care (Eccles et al., 2002)

Questionnaire survey and in-depth interviews used to assess patients' preferred method for consenting to the use of medical records for research (Willison et al., 2003)

Questionnaire survey and in-depth interviews used to explore the impact of teaching in general practice (Walters et al., 2003)

Observations using videotape, and mean scores from an examiner checklist used to study the effect of ethnicity on examination performance (Wass et al., 2003)

Analysis of routine data and interviews with managers to explore bed use in different health systems (Ham et al., 2003)

1.2 A focus on mixed methods research in primary research within single studies in health services research

Mixed methods research can have a variety of meanings and be undertaken in a variety of contexts. The focus for this study is on combining qualitative and quantitative methods in primary research within single studies in HSR.

1.2.1 Combining qualitative and quantitative methods

The term 'mixed methods' can be applied to combining different qualitative methods, or making use of a strategy associated with one methodology in the context of another, or where there are two components within a study - one using a qualitative method and the other a quantitative method. Rather than attempt to encompass all definitions of mixed methods, the focus of this study is on the use of a qualitative and a quantitative component within a study. Quantitative components include experimental designs such as randomised controlled trials, and surveys, while qualitative components include ethnography, case studies, depth interviews, focus groups, and observation (Creswell, 2003).

1.2.2 Primary research

Methods can be combined within the context of a primary research study, evidence synthesis, or a study where both primary and secondary research is undertaken. There is considerable interest in HSR currently in review and synthesis of evidence from qualitative and quantitative studies (Dixon-Woods et al., 2004; Mays et al., 2005; Mays et al., 2001). Although there is some overlap between evidence synthesis and mixed methods in primary research (Dixon-Woods et al., 2004), each context has issues specific to it. The focus of this study is mixed methods research in the context of primary research. Nonetheless, literature about evidence synthesis has been explored in case there are lessons of relevance to primary research.

1.2.3 Single studies

Mixed methods research can be considered within the context of a single study, or within a programme of research where different methods are used in separate parts of the programme (Bryman, 1992; Morgan, 1998). There are many similarities between mixed methods research undertaken in the context of a single project or in the context of a programme. In both contexts, the methods may be undertaken simultaneously or sequentially; by different researchers or the

same researchers; and with different researchers working separately, or in collaboration, or in an integrated way. However, there are some important differences. Within a programme it is likely that projects will be linked but self contained (Morse, 2003), whereas this may not be the case within a single project where some methods may not be self-contained but inter-dependent. Additionally, there may be expectations of, and possibilities for, combining methods at the level of a single study which might not be held for programmes. This has led researchers in the field of mixed methods research to conclude that it is debatable whether the term 'mixed methods' should be used to refer to a programme of research of single method studies (Sandelowski, 2003). The focus of this study is mixed methods research in the context of a single study rather than a programme, although literature concerning programmes has been included with a view to gleaning lessons for single studies.

1.2.4 Health services research

Research into health is undertaken by a number of research communities – public health, health promotion/education, primary care, medical sociology, nursing, epidemiology – to name but a few. Health services research has a specific focus on the description or evaluation of health *services* or health care, in distinction to epidemiology, say, where the focus is the study of *disease* in a human population. Thus health services research is a specific type of research, with a specific focus, history and research community. However, in practice there may be difficulties distinguishing it from other fields of health research. Health services research may be undertaken by researchers who class themselves as health services researchers, or by public health researchers who study health and health needs including services, or by health promotion/education researchers who study prevention possibly through services, or by nurse researchers or primary care researchers. The focus of this study is health services research with the recognition that establishing clear boundaries between HSR and other types of health research may be difficult.

1.3 Aim and objectives

This thesis is an exploration of a methodological approach, and its exploitation in HSR, rather than perhaps the more standard approach of an empirical study of a substantive area. The aim of the study is to explore how researchers in health services research are exploiting the potential of using a mixed methods approach in their studies. The objectives are:

- To identify key issues about mixed methods research of relevance to the HSR community by exploring the literature about mixed methods research in the fields of health, social, educational and behavioural research.
- To identify how researchers might fully exploit the potential of mixed methods studies by exploring the literature about mixed methods research in the fields of health, social, educational and behavioural research.
- To assess how mixed methods studies are undertaken in health services research and whether they fully exploit the potential of this approach.
- To identify the facilitators and barriers to researchers undertaking health services research fully exploiting the potential of mixed methods research.
- To make recommendations to the HSR community about how to exploit the potential of mixed methods studies.

1.4 Design

A literature review can aid understanding of how the HSR community *can* fully exploit mixed methods studies by identifying the range of ways in which methods can be combined and the important issues to consider. Empirical study can aid understanding of how this approach *is* being used and the facilitators and barriers to exploiting mixed methods studies in practice. The *extent* to which practices identified in the literature are being followed in HSR is best explored using a quantitative approach. Understanding *why* researchers do or do not exploit the potential of mixed methods studies in HSR is best explored using a qualitative approach. Thus a mixed methods study based on primary research is appropriate for exploring these interrelated issues.

1.5 Theoretical position

A controversial issue in the literature on mixed methods research is that of paradigms, particularly which paradigms and philosophical positions are compatible with a mixed methods approach (see Chapter 2). Given that the empirical approach in this study is mixed methods research, it is important to clarify the philosophical position adopted.

1.5.1 Subtle realism

The position adopted for this study is that of 'subtle realism' (Hammersley, 1992). Subtle realism is a useful position to adopt for researchers undertaking mixed methods studies because it positions both quantitative and qualitative researchers within the same ontological arena of realism, and removes barriers to combining qualitative and quantitative research (Murphy, 2001). It was first proposed as a position to adopt within HSR by researchers credited with putting qualitative research on the health services research map (Pope & Mays 2000:51) and has been further recommended to health services research in the context of studying the delivery and organisation of health services (Murphy, 2001).

Subtle realism requires reflection and awareness of the role of the researcher in how they have shaped the research question, data collection, analysis and interpretation. It operates in contrast to the more positivist approach associated with some quantitative research in HSR where researchers attempt to remove any influence of the researcher on the research process. This is reflected in the invisibility of the researcher within any written dissemination of study findings in HSR. Adopting a subtle realist approach situates the researcher within the picture. In recognition of this, the first person is used in the rest of this chapter.

Adopting the position of subtle realism has meant that I have treated reality as independent of the claims I make about it; that I acknowledge that I can only be reasonably confident, rather than certain, about any claims I make; and that I have been able to make a selective representation of reality rather than reproduction of it, because only some features under study are relevant to myself and my study (Hammersley 1992). Thus throughout this study I have tried to give a representation of mixed methods research in health services research whilst recognising that another researcher might give a different, non-contradictory, one (Murphy, 2001).

1.5.2 My background

My whole approach to this thesis has been affected by my work biography (Mechanic, 1989) and it is important to document the journey I have taken to this study of mixed methods research. I began my research career as a statistician in the field of academic health services research, quickly becoming more interested in applied quantitative research than statistics, specifically the evaluation of new health services. I made use of multiple quantitative methods in these evaluations, usually the analysis of routinely available data and data collected through postal or face-to-face administered surveys. In 1990 I began to work as a researcher in health authorities in the National Health Service (NHS) and realised that my employers were interested in questions which required a wider variety of methods than those I employed. In the NHS in the early 1990s there was a strong movement towards gaining consumers' views of services. Surveys were only one method in the toolkit available and there was considerable interest in the use of qualitative research methods such as focus groups and in-depth interviews. While working for the NHS I employed qualitative researchers and market researchers to undertake any qualitative research required and worked alongside them. When I returned to an academic research environment in the late 1990s, health services researchers had embraced qualitative methods into their hitherto predominantly quantitative world. I wanted to continue addressing a range of questions within my research and to use the range of methods that might best answer them. I started to use semi-structured interviews alongside a variety of quantitative methods in the context of service evaluation. For example, interviews with health professionals involved in shifting emergency beds into the community to gain their views of an innovative approach; interviews with stakeholders associated with NHS Direct to gain their hopes and fears for the new service; and interviews with NHS Direct nurses to understand variations in health care advice.

My 20 year career has been solely situated in HSR, either in an academic or NHS environment. Quantitative methods have dominated my experience as indicated by my first author status on peer-reviewed primary research papers – 8 quantitative articles, 3 qualitative articles and 1 mixed method article. Increasingly my approach within my studies is mixed methods. My interest in mixed methods research developed through my involvement in a particular study – an evaluation of evidence based leaflets in maternity care. I coordinated a randomised controlled trial while another research group from a different school in the same university ran an ethnographic study alongside it. The study was successful in that both components were completed and reported within the same document, (Kirkham & Stapleton, 2001) and a number of publications emerged (O'Cathain et al., 2002; Stapleton et al., 2002). Significantly, a paper reporting the main results of the trial, and a paper reporting the key results of the ethnographic study, appeared alongside each other in the same edition of the BMJ which is a key journal in

HSR. Yet I found myself disappointed at the end of the study, feeling that we should have been able to do more around combining the qualitative and quantitative components of the study.

1.5.3 The possible effects of my work biography on this study

I am aware that my biography has shaped this study in the following ways:

- I am looking at HSR from the perspective of a health services researcher. This has shaped the research questions I have asked. Additionally, I may be less critical of HSR than an outsider.
- Historically I am quantitative researcher. However, I have attempted not to align myself with a particular type of research or researcher during this study. I have worked at guarding against partisan views of different types of research and researchers and striven for a sophisticated understanding of all types of research and researchers within mixed methods studies (Dingwall, 1980).
- I am an applied researcher and have had to make an effort to engage with the theoretical aspects of research. I have a preference for empirical research and this has certainly shaped my approach to this study, which is based largely on empirical data.
- I am an advocate of mixed methods research and this has shaped my research questions which essentially address how we can undertake better mixed methods studies rather than whether we should be undertaking them at all. However, I have tried to be open to exploring the possibility that a mixed methods approach is not appropriate in HSR. I have attempted to be open to the argument that mixed methods research cannot be undertaken due to paradigmatic differences rather than been driven solely by my belief that it is necessary.
- I have set out with a belief that health services researchers are not making best use of this approach. Thus ways of improving the use of this approach in health services research have been more relevant to me than reasons why mixed methods studies should not be undertaken. Additionally, having experienced a sense of 'missed opportunity' around a mixed methods study I had been involved in, and heard this from other researchers, I have had to make an effort to ensure that I widen my perspective to listen to positive experiences of undertaking mixed methods research.
- I consider myself to be a mixed methodologist and the exploration of the expertise needed for mixed methods studies, in particular the potential for the emergence of the

role of a mixed methodologist in research teams, has been of interest to me within this study. It might not have been seen as relevant by another researcher undertaking this study.

In summary, I came to the subject of mixed methods with a position and an agenda. My position was one of pragmatism, with the assumption that we do mixed methods studies because they are sometimes necessary. My agenda was to improve the way in which health services researchers use a mixed methods approach. I have explored mixed methods studies as a health services researcher, working within a system which values a more positivistic approach to research. There is little doubt that an anthropologist (for example) would have approached this study differently, and even if they had used the same methods they would have identified different issues during the analysis. I have tried to be aware of this but at the end of the day I am a health services researcher who wants to help myself and other health services researchers to exploit the potential of mixed methods studies. My intended audience is myself and other health services researchers.

Chapter 2 Review of the literature on mixed methods

2.1 Background

Researchers in different fields, such as social, educational and behavioural research, have written about the theoretical and practical issues involved in combining qualitative and quantitative methods. Health services researchers are using this methodological approach and have contributed to some extent to the literature about mixed methods research. However, there could be considerable learning for the health services research community in the discussions of mixed methods research in other fields. One aim of this literature review is to identify the key issues about mixed methods research which may be relevant to the health services research community and which may facilitate learning within that community.

A later part of this study involves empirical research about the extent to which health services researchers are exploiting the potential of mixed methods studies and what may help or hinder them in doing so. A second aim of this literature review is to guide the empirical research in terms of identifying how researchers can exploit the potential of mixed methods studies, and what the possible facilitators and barriers to exploiting the potential of mixed methods studies might be.

2.2 Methods

The 'systematic review' or 'Cochrane type' review has become the norm for reviews of empirical studies in health research (www.york.ac.uk/inst/crd/index.htm 17/1/06). However, techniques for reviewing a method are different from those for reviewing empirical studies (Hutton & Ashcroft, 1998) and are not as well defined (Lilford et al., 2001). A 'methods review' involves extracting a small number of arguments, and ideas, from a large number of publications where

these arguments have been discussed originally and then repeated in later publications. The emphasis is on being systematic rather than exhaustive, by searching widely rather than chasing every reference. The process of 'theoretical saturation' has been proposed for methods reviews, where the literature search is wide enough to ensure that all possible arguments have been included, but the pursuit of literature stops when new arguments no longer emerge (Edwards et al., 1998). This approach has been adopted in a review of qualitative research methods, with the additional use of 'constant comparison' of the viewpoints of the different authors, and 'deviant case analysis' whereby the views of authors who offer different perspectives are sought (Murphy et al., 1998). An alternative approach of a 'selective narrative review' has been undertaken for a methods review around questionnaire design (McColl et al., 2001). The emphasis there was on transparency of methods and decisions, to ensure the reproducibility of the review. Reproducibility was important because these researchers were identifying empirical research about aspects of a method, rather than arguments and ideas. The process of theoretical saturation, rather than transparency of method, has been applied to this review because the focus is on researchers' arguments rather than their empirical research on aspects of mixed methods research.

Given that the focus of the study is mixed methods research in health services research, the first stage involved searching the health databases MEDLINE (1966 to June 2003) and CINAHL (1982 to June 2003), which cover medical and nursing research respectively. Searching for literature on methods is challenging because of the difficulty of extracting articles that focus directly on methods. A variety of search terms were used including 'mixed method', 'multi-method', 'triangulation', 'multiple method', and 'qualitative AND quantitative'. These terms identified mainly irrelevant publications, for example publications where the term 'mixed' applied to the intervention under study, and publications reporting mixed methods studies. For example, the term 'mixed method' in MEDLINE identified 39 articles, only 6 of which potentially focused on methods. Some terms identified hundreds, and sometimes thousands of articles; when a sample of these publications was studied, most were found to be irrelevant. For example, the term 'qualitative AND quantitative' in MEDLINE identified 19461 articles; of the 30 most recent, only one potentially focussed on methods. To maintain a wide search, all the search terms were used but only the most recent 30 articles were studied if a search term produced over 100 articles. English language articles which potentially focused on methodological issues were obtained and read. References in these articles were read as another potential source of articles. Theoretical saturation was considered even at this early stage. For example a small foray into papers considering mixed methods in the context of a particular research area e.g. chronic disease (Casebeer & Verhoef, 1997) revealed that these papers merely repeated points made elsewhere for the benefit of a specific audience, with the small benefit of offering access to examples of mixed methods studies.

The next step in this iterative process was to seek expert opinion encapsulated in key text books identified from the reference lists of the papers read in the first stage (Brannen, 1992a; Brewer & Hunter, 1989; Bryman, 1988; Greene & Caracelli, 1997a), and from newly published books about mixed methods (Creswell, 2003; Tashakkori & Teddlie, 1998; Tashakkori & Teddlie, 2003). The first set of books offered access to the basis of any knowledge in the health field, and the second set offered the most up-to-date thinking on mixed methods available to researchers. The content of these books both deepened and widened existing themes, and identified further themes. An example of a further theme emerging at this stage was the issue of quality of mixed methods studies, particularly 'interpretative rigour' and the possible need for new language to describe the quality of interpretation of mixed methods studies. References were searched and a further text book was identified (Fielding & Fielding, 1986).

The final stage was a search of the Social Science Citations Index to identify social research, PsycINFO to identify behavioural research, and ERIC and the British Education Index to identify educational research. These searches covered the period 1981 to November 2003 using the terms 'mixed method*', 'multi-method*', and 'qualitative AND quantitative AND combin*'. This last term was introduced because of the vast number of empirical studies identified using only 'qualitative AND quantitative'. The addition of the term 'AND combin*' was sensitive to methodological papers. The term 'mixed method*' identified a relatively small number of articles on each database, for example 89 on ERIC. Where more than a 100 titles and abstracts were produced by a term on a database, the most recent 100 were studied. The process of theoretical saturation was key to this stage. The search was for new themes, underdeveloped themes, and different perspectives on established themes. An example of the further development of an underdeveloped theme at this stage was the criticism of mixed methods research as a distraction from using qualitative methods with depth, a viewpoint expressed by some feminist researchers (Deem, 2002).

The search for literature took place in 2003 and was followed, towards the end of the study, by a less systematic approach to identifying new books and journal papers. Examples of new literature emerging between 2003 and 2006 was a book focused on educational research (Gorard & Taylor, 2004), a paper on combining qualitative and quantitative evidence (Mays et al., 2005), and a paper on combining process and outcome evaluation (Oakley et al., 2006).

Eleven themes were identified in the literature and the discussion which follows is organised around these themes. The dual purpose of the literature review is followed through in the boxes at the end of each theme which both summarise learning for the HSR community and identify issues for the empirical research in this study.

2.3 THEME 1 Defining mixed methods

Many researchers have attempted to give definitions of 'mixed methods', with some inconsistency between these definitions. Key researchers in mixed methods research have defined a mixed method study as combining "qualitative and quantitative approaches into the research methodology of a single study or multi-phased study" p17-18 (Tashakkori & Teddlie, 1998). The term 'approach' is a broad one and includes for example a quantitative analysis of qualitative data, that is, the data collection is associated with one methodology and the data analysis with the other. Other researchers have been more specific in their definitions, requiring the presence of both qualitative and quantitative methods rather than 'approaches' within a single study. Mixed methods designs have been defined as ones which include at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither type is linked to a particular inquiry paradigm (Greene et al., 1989). Similarly, mixed methods have been defined as quantitative and qualitative data collection and analysis within a single study, with data integrated at some stage (Creswell et al., 2004). In this latter definition there is the additional requirement of integration between methods.

Some of the definitions above require the presence of two separate approaches to data collection. 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, open-ended questions on a questionnaire. A single method of data collection including both qualitative and quantitative approaches has been labelled intra-method mixing as opposed to inter-method mixing (Johnson & Turner, 2003). When a single method is used, it is not considered to be a genuine combination of quantitative and qualitative research because it does not reflect the strengths of the different methods (Bryman, 1992). However, an emphasis on inter-method mixing is considered to be too limiting by other researchers who are interested in mixing across the different stages of a study and call these studies 'mixed model studies' (Tashakkori & Teddlie, 1998).

As well as disagreement about whether more than one method of data collection is required to be present for a study to be mixed methods, definitions take for granted the definitions of qualitative and quantitative research, which can be described in terms of their methods, traditions or approaches (Spencer et al., 2003). Distinctions have been made between qualitative and quantitative research, but some researchers consider these to be unhelpful (Hammersley, 1996). For example, a survey is considered to be a quantitative method but there is considerable inconsistency around the status of open questions from surveys. Some researchers have excluded the analysis of these from a review of qualitative studies (Boulton et al., 1996) while others have included them in discussions of mixed methods (Morse, 2003; Steckler et al., 1992).

Further, the term 'mixed methods' is not applied exclusively or uniquely to studies using both qualitative and quantitative methods. Although 'mixed methods' is most commonly employed to describe the use of both qualitative and quantitative methods, it can be applied to studies which involve different qualitative methods only, such as focus groups and interviews (Barbour, 1998; Fielding & Fielding, 1986; Morse, 2003), and studies which involve different quantitative methods only, such as a randomised controlled trial and a quantitative observational study (Morse, 2003). As well as a lack of uniqueness in use of the term 'mixed methods', there are also other terms in play – those of 'multi-methods' and 'multiple methods' (Stecher & Borko, 2002) and 'multi-strategy research' (Bryman, 2001). Ong introduces 'multi-method' research as projects utilising more than one method at a time (Ong, 1993) and seemingly these methods can be all quantitative or a mixture of qualitative and quantitative. Leading mixed methods researchers have suggested the need to distinguish between multi-methods and mixed methods, reserving the former term for studies which use a number of qualitative approaches only or a number of quantitative approaches only (Teddlie & Tashakkori, 2003). Finally, as soon as a newcomer enters the arena, the established approaches need a label so the two can be distinguished. Researchers have used the term 'mono-method' to refer to studies making use of one method only (McConney et al., 2002; Tashakkori & Teddlie, 1998).

Implications for HSR

1. Clarifying the definition of 'mixed methods' – Researchers who write about the methodological issues in mixed methods research often use different definitions of 'mixed methods'. Therefore their discussions may not always be relevant to the reader, who may hold a different definition. Health services researchers wanting to learn more about mixed methods approaches will need to clarify their definition of mixed methods research and ensure that it is compatible with the definitions used in different methodological literature.

2. Distinguishing between the term 'multi-methods' and 'mixed methods' - There is a lack of consistency in the language used to describe the combination of different methods within the same study. It would be sensible for the HSR community to follow the current trend of distinguishing between studies using quantitative methods only and those using both methodological approaches, where 'multi-method' is used to refer to the former and 'mixed method' to the latter. Even though it is likely that some issues discussed in the context of combining different qualitative methods say, are also relevant to combining qualitative and quantitative methods, it can be argued that qualitative and quantitative approaches are

associated with different paradigms or world views (see Section 2.4), with different approaches taken to sampling, analysis and quality assessment, and therefore will have specific challenges.

Implications for this empirical study

1. Clarifying the definition of a mixed methods study- In the introduction of this thesis, a mixed methods study was defined as one where both qualitative and quantitative methods are used within the same study. Having read the range of definitions used in the literature, this remains the focus of the study. However it is useful to note that this definition is narrower than that used by Tashakkori & Teddlie, who are interested in qualitative and quantitative ‘approaches’, which might include for example a qualitative study analysed quantitatively. Therefore some of their discussions may not be relevant to this thesis. The definition used here is similar to Bryman’s, who requires the presence of both a qualitative method and a quantitative method.

Creswell’s definition (among others) specifies that quantitative and qualitative data collection and analysis are present in mixed methods studies. This highlights the need to define ‘method’ for this study. In this study, a method is quantitative if the data collection is pre-determined and standardised, and the analysis is statistical; a method is qualitative if the data collection is non-standardised and open, and the analysis is textual. This requires two separate sets of data collection, for example a postal survey and an in-depth face-to-face interview. Open questions on questionnaires would be classified as intra-method mixing and excluded from the definition of mixed methods used here.

Creswell’s definition requires integration between methods at some stage of the study. This will not be included in the definition used in this study but will be considered in more depth throughout the literature review.

2. Clarifying the status of literature on multi-methods- The focus of this study is mixed methods research, that is, the combination of qualitative and quantitative methods, rather than multi-methods or mono-methods. However, due to the interchangeable use of terms by some researchers, databases have been searched for this literature review using the terms ‘mixed methods’, ‘multi-method’ and ‘multiple methods’, and publications followed up particularly if they referred to the use of qualitative and quantitative methods. Some literature about mixing qualitative methods or quantitative methods only was read in case it covered relevant issues for mixed methods research.

2.4 THEME 2 Paradigms

A commonly occurring theme within the literature on mixed methods research was paradigms (Baum, 1995; Brannen, 1992b; Greene & Caracelli, 1997b; Poole et al., 1999; Roter & Frankel, 1992; Sale et al., 2002; Sandelowski, 2000; Shih, 1997). In fact it was almost impossible to read anything about mixed methods research without the paradigm debate being discussed. The reference list in the first sentence of this section could easily have included at least 50 references but only a few have been formally referenced.

2.4.1 The paradigm debate

Qualitative and quantitative researchers are described as committed to different epistemological and ontological positions, with the former grounded in an interpretivist or constructivist paradigm and the latter in a positivist or post-positivist paradigm. The paradigms are contrasted on subjectivity-objectivity, induction-deduction, relativism-realism, holism-reductionism and other dichotomies. For example, researchers in different paradigms hold different assumptions about the nature of reality and the relationship between inquirer and object of inquiry.

Some researchers consider the two paradigms to be incommensurable because they embody incompatible assumptions about human nature and the nature of knowledge claims. Mixing qualitative and quantitative methods is considered impossible or unacceptable to researchers adopting this 'purist' stance (Greene & Caracelli, 1997b). Guba & Lincoln are often referenced as a source of this incommensurability argument, yet in a recent publication they argue that they have been misunderstood (Guba & Lincoln, 2005). They say that although they argued originally that the two paradigms they described are incompatible, they also pointed out that methods are not exclusive to paradigms. This separation of methods from paradigms has been argued by other researchers for many years (Bryman, 1988).

An alternative stance to the incommensurability argument is a 'pragmatic', 'technical' or 'instrumental' one, where the decision about methods is driven by practical demands, choosing the appropriate method to answer a particular question based on what will work best in practice (Creswell, 2003; Murphy & Dingwall, 1998; Poole et al., 1999). Here, researchers can explicitly adopt a paradigm or philosophical position which they feel is appropriate to mixed methods research. Three paradigms have been proposed:

- Variants of realism - Naive realism, with the belief in a *single* unequivocal truth that is entirely independent of the researcher and the research process, has been rejected for Bhaskar's critical realism (Benton & Craib, 2001), subtle realism (Hammersley, 1992), emergent realism (Mark et al., 1997) or post-positivism (Clark, 1998). These assume the existence of external reality but emphasise the tentativeness and uncertainty around any empirical observations.
- Pragmatism, where the research question is considered to be more important than the method used or the paradigm which underlies the method (Tashakkori & Teddlie, 1998). It avoids the concepts of truth or reality and is a practical and applied philosophy (Teddlie & Tashakkori, 2003).
- The transformative-emancipatory paradigm where the experiences of people who have suffered discrimination are considered to be important, with interaction between researcher and participants essential (Mertens, 2003).

Although a technical stance is adopted by many researchers writing about and undertaking mixed methods studies, some researchers are wary of a pragmatic stance being adopted uncritically by simply ignoring the assumptions behind the qualitative-quantitative debate (Brannen, 1992b; Sale et al., 2002). They argue that this may lead to practical difficulties integrating methods, may limit the full potential of mixed methods (Greene & Caracelli, 2003), and may have a significant impact on the inferences drawn from mixed methods studies (Miller, 2003). Brannen (1992b) urges researchers to retain some elements of dichotomy and opposition to seek new understandings. Proponents of this 'dialectical thesis' propose that researchers embrace the differences between qualitative and quantitative research and see what can be learnt and created from them (Greene & Caracelli, 1997b; Greene & Caracelli, 2003). To do this, they argue that there is a need to move away from irreconcilable paradigm attributes, such as objectivity and subjectivity, and explore others such as meaning and causality, or the unusual and the representative (Greene & Caracelli, 1997b).

Finally, arguments about paradigms can become mixed up with the role of gender in research (Oakley, 2000). Oakley (2000) disagrees with the belief that feminist researchers can only be qualitative researchers undertaking emancipatory research, who cannot engage with experimental designs such as randomised controlled trials.

2.4.2 The paradigm debate in HSR

The paradigm *debate* has not really taken place in HSR. However, a number of key researchers in HSR have promoted a philosophical stance which includes both qualitative and quantitative research. Rather than adopt pragmatism, like some key mixed methods researchers in educational research (Creswell, 2003), researchers in HSR have focused on realism as an important philosophical position. The realist principle has been advocated in the context of process and outcome evaluation in health promotion (Parry-Langdon et al., 2003), and subtle realism has been adopted as a way of accepting qualitative and quantitative methods in primary research (Fulop et al., 2001; Hammersley, 1992; Murphy, 2001; Pope & Mays, 2000) and in the synthesis of qualitative and quantitative evidence (Mays et al., 2005). A realist stance has been considered essential in another applied research field - government-funded social research - when researchers explored how to assess the quality of qualitative research. They excluded approaches to research which they considered to be unsuitable for policy research, for example those which dismiss objectivity, emancipatory research, any approaches where there is considered to be no separation between the researcher and the researched, and post-modern research (Spencer et al., 2003).

Implications for HSR

1. *Thinking about paradigms* - The issue of paradigms is discussed extensively in the literature on mixed methods in the fields of health, social, educational and behavioural research. However, the HSR community has a short history of engaging explicitly with paradigms because of the dominance of quantitative approaches within HSR. Recent discussions around paradigms and qualitative research may need to be built upon carefully when engaging researchers about paradigms and mixed methods research.

2. *The necessity of realism* - It seems likely that some philosophical positions, such as realism, will be more acceptable within HSR than others, because research is applied and policy-related. Thus it is likely that qualitative research in HSR will operate within the same ontological space of realism as quantitative research. This may reduce some of the potential paradigmatic differences between qualitative and quantitative researchers in HSR, but may not reduce the challenges of different researchers valuing different methodologies.

3. *Subtle realism and pragmatism in HSR* - Pragmatism has been adopted by a number of mixed methods researchers in other fields and there is evidence that it will be attractive to the

HSR community. However, Brannen's caution about the problems researchers may face in practice if they choose to ignore paradigmatic differences may be worth heeding in HSR. Subtle realism is gaining a body of followers in HSR who see it as allowing the combination of qualitative and quantitative research in both primary and secondary research.

Implications for this empirical study

Paradigmatic issues may be a challenge to exploiting the potential of mixed methods studies in HSR. It is important to understand how researchers in HSR address paradigms in their mixed methods studies and whether paradigms are raised as either a facilitator or a barrier to exploiting the potential of studies in the interviews with researchers.

2.5 THEME 3 Justifications for mixed methods studies

Having considered the challenge posed by possible paradigmatic differences between qualitative and quantitative research, one needs to ask why researchers are undertaking these types of studies in the first place. Four arguments are put forward to justify the use of mixed methods research. First, health and health services are complex (Baum, 1995; Casebeer & Verhoef, 1997) requiring researchers to address a range of questions and issues including process and context as well as outcome (Poole et al., 1999). Also, research problems tend to be presented by managers and policy-makers who have multiple questions (Ong, 1993) and different methods are suited to answering different types of questions. Thus researchers may be required to address a number of questions within a single study. Second, each method has specific weaknesses, and using a range of methods allows one method to compensate for any weaknesses in another (Greene & Caracelli, 1997b). If findings converge despite the use of different methods then confidence in those findings is heightened. Third, a mixed methods study might be second best or 'satisficing' because it may be impractical to undertake the single method study ideally required (Datta, 1997). Fourth, using a mixture of methods can give voice to a range of people, particularly marginalised groups (Mertens, 2003).

Thus the reason for taking a mixed methods approach might be to provide comprehensiveness by addressing a range of questions, to provide confidence in findings, to act as a pragmatic substitute for an ideal single method design, or to aid the emancipation of marginalised groups. However, a more cynical view might be that they are more likely to ease access to research sites, obtain funding, or convince policy makers because part of them will appeal to everyone (Bryman, 1992; Greene et al., 1989; Lawrenz & Huffman, 2002). Indeed it may be that a mixed

methods approach is no better than a mono-method approach in some circumstances (Bryman, 1992), making it necessary to justify the use of a mixed methods approach within a study, and explain why a mixed methods approach can provide more value than a mono-method study, or a series of separate mono-method studies.

Teddlie & Tashakkori detail three areas where mixed methods designs are superior to single method designs (Teddlie & Tashakkori, 2003). First, they can answer research questions other methodologies cannot, second they provide stronger inferences, and third they offer greater diversity of divergent views. These are similar to the justifications given earlier but draw attention to the importance of the research question in determining the value of using mixed methods research. If mixed methods designs can answer research questions which other methodologies cannot, then there must be 'mixed methods research questions'. Teddlie & Tashakkori argue that qualitative research questions tend to be exploratory and quantitative research questions tend to be confirmatory, so a mixed methods study enables a researcher to simultaneously address confirmatory and exploratory questions. They also suggest that research around complex social phenomena requires a range of different kinds of questions to understand complexities. Together, these suggest that a 'mixed methods question' has a number of questions within it and is asked of a complex issue.

Implications for HSR

1. Justifications for mixed methods studies which are relevant to HSR - The need to answer a range of questions, particularly in the context of the evaluation of complex interventions, appears to be the justification given for using mixed methods studies in health research. Therefore only some of the literature on mixed methods research may be of direct relevance to HSR, in particular the literature that discusses the complementary use of methods rather than the use of methods for providing confidence in findings, or for emancipation. Alternatively, the HSR community may need to consider the other justifications for using mixed methods research and whether they might be useful in HSR.

2. Types of questions which require mixed methods research – If undertaking mixed methods research is not a self evident good, then it is important for the HSR community to consider when it is value for money to undertake a mixed methods study - when it is essential, optional or inappropriate. Teddlie & Tashakkori highlight two issues to consider in this deliberation - the type of question and the complexity of what is being researched. A narrow question such as "how many people use this service?" might require a mono-method approach, whereas a broad question such as "is access to this service acceptable?" might require a mixed

methods approach. For an intervention at the simple end of the spectrum, such as a drug, one might argue that a mixed methods approach is optional, whereas for an intervention at the complex end of the spectrum one might argue that a mixed methods approach is essential.

Implications for this study

1. Understanding why researchers in HSR use a mixed methods approach - It appears from the literature on health research that the main justification for using a mixed methods approach is comprehensiveness. It could be argued that having a single justification is appropriate because it is shaped by the needs of HSR, or that it limits the exploitation of mixed methods in HSR. Also, researchers may decide to undertake a mixed methods study for reasons other than the research question or the complexity of the issue under study. Decisions may be based on 'strategic' issues such as the need to gain funding and the attractiveness of mixed methods research to the funding body. Any strategic use of mixed methods studies may limit the potential of this methodological approach in practice. Therefore it would be useful to explore the justifications which researchers give for undertaking mixed methods studies both in study documentation and in interviews, and how this shapes the potential to exploit this approach in HSR.

2. Assessing the appropriateness of using mixed methods studies in HSR – The HSR community could be using mixed methods research inappropriately by undertaking this approach to address questions best addressed by mono-methods or multiple methods, or by using mono-method studies where mixed methods studies are more appropriate. Empirical study of this issue would require identifying the original research question posed by commissioners, and considering the complexity of the issue under study, to assess whether mixed methods studies were being used when they were needed. Although this is an aspect of the exploitation of mixed methods research in HSR, it has not been explored in the empirical research here. Instead the focus of the empirical research has been on exploiting the potential of mixed methods studies when the decision has been made to undertake such a study.

2.6 THEME 4 The roles of methods

Researchers have considered the potential roles of qualitative and quantitative methods within a mixed methods study. These are considered below in the context of the different stages of a study (Box 2.1). This general structure has been used by others to describe ways of using qualitative and quantitative methods together (McDowell & MacLean, 1998).

Box 2.1 Roles of different methods within a mixed method study

STAGE		ROLES
Defining the research question		A qualitative method can generate a hypothesis for a quantitative method to test (Bryman, 1992), establish the theoretical framework for the quantitative method (Sieber, 1973), or help conceptualise the whole study (McDowell & MacLean, 1998).
Designing the study	Determining the sample	A quantitative method can facilitate the sampling strategy for a qualitative method (Bryman, 1992), for example a survey can distinguish representative from non-representative cases (Sieber, 1973).
	Improving the conduct of a method	When designing a trial, qualitative research may help to design appropriate recruitment strategies and information (Donovan et al., 2002). This could be used for other quantitative methods such as surveys.
	Designing study instruments	A qualitative method can help to design good survey instruments (Krause, 2002; McDowell & MacLean, 1998; Sieber, 1973), and aid scale construction from them (Bryman, 1992). In the context of evaluation, it can identify the outcomes important to different stakeholders, for inclusion within instruments (Murphy et al., 1998).
	Developing or optimising interventions	When evaluating an intervention like a service (Rousseau et al., 1999), qualitative methods can help to develop the intervention (Bradley et al., 1999), develop an understanding of how the intervention works and who it might be most effective for (MRC, 2000), and indicate why the intervention has not worked (Bradley et al., 1999).

Addressing the range of research questions	Understanding how interventions work in the real world	A complex intervention may operate differently in practice from the original intention and qualitative research can address how an intervention is used in practice while quantitative research is used to measure outcomes (Parry-Langdon et al., 2003). The strength of qualitative research to assess processes has been noted in social research (Bryman, 1992).
	Getting a range of perspectives	Qualitative research can help researchers to gain access to the views of participants while quantitative research allows researchers to explore their own agenda (Bryman, 1992).
Analysis		The results from one method can affect the analysis of the other method, or qualitative and quantitative data can be combined for further understanding (Caracelli & Greene, 1993). For example, qualitative data can be 'quantitised', that is, numerically coded for analysis with the quantitative data.
Making use of the results	Interpreting the findings	Each method can provide different aspects of a phenomenon (Bryman, 1992). A qualitative method can explain factors underlying relationships in a quantitative study (Bryman, 1992), confirm or contradict survey findings, interpret statistical relationships, explore puzzling responses or results, or offer case study illustrations (Sieber, 1973). It may change the interpretation of findings (Murphy et al., 1998), for example urging that a treatment is not rejected as ineffective simply because it was not used, but finding a way of it being used so that it might be effective (Weinholtz et al., 1995). In the context of evaluation, qualitative methods can describe the context in which the study operates, in particular what is going on with controls, thus aiding interpretation (Murphy et al., 1998).
	Determining generalisability	A quantitative method can help to generalise a qualitative study (Bryman, 1992), for example a survey can situate the context of case studies (Stecher & Borko, 2002).
	Implementation	Qualitative methods can be used to consider the results of a study and their application within a real world context, drawing on pluralistic views of different stakeholders (Murphy et al., 1998).

Implications for HSR

1. Drawing on the range of roles of methods - It is important that the HSR community understand the different roles which can be taken by the different methods and make full use of the range of roles relevant to HSR. It is significant that much of the literature about roles does not consider some methods which are key to HSR, in particular the randomised controlled trial.

Implications for this study

1. Assessing the roles of methods in mixed methods studies in HSR - The HSR community may be drawing on the full range of combinations of methods listed here, or they may make use of some roles only, or they may make use of other roles specific to HSR. It would be useful to consider the different roles taken by methods in mixed methods studies in HSR and compare them with the list identified from reading the literature to identify any gaps or unique contributions within HSR.

2.7 THEME 5 Types of research

Mixed methods research tends to be most commonly discussed in the context of three types of research: instrument development and testing (Coyle & Williams, 2000), evaluation (Greene & Caracelli, 1997a; Murphy et al., 1998), and the combination of fieldwork and surveys (Sieber, 1973). In public health, it has also been discussed in the context of needs assessment (Baum, 1995).

2.7.1 Instrument development

In the context of instrument development, some survey methodologists suggest using a literature review and expert opinion to guide item generation whereas others suggest that

instruments should be grounded in the views and language of the proposed respondents to the questionnaire. Qualitative methods such as focus groups or interviews can be used to generate items for a questionnaire. Instrument development can be undertaken as a discrete study or as part of a wider study such as an evaluation. The priority may be the quantitative research, where the instrument is the focus, or it may be the qualitative research if it is used to challenge the use of a research instrument (Brannen, 1992b). Although researchers tend to include instrument development in their discussions of mixed methods research (Creswell 2003), some researchers exclude it (Morse, 2003).

Some problems have been highlighted with the use of a mixed methods approach in instrument development (Coyle & Williams, 2000). When translating qualitative findings into an instrument, much may be lost in terms of complexity of understanding, attention to context, recognition of the variety of issues because these are scaled down through factor analysis, and a focus on people because attention is given to variables (Masse, 2000). Therefore it is seen as important to make use of findings from both of the methods, and to see them as complementing each other, rather than thinking that the instrument 'captures' the qualitative research. Rather than using qualitative research only in the preliminary stage of a research study to strengthen quantitative research, it is seen as deserving its own space because it will uncover and give attention to issues not covered in the survey instrument.

In the context of instrument testing, there is growing use of qualitative methods for the cognitive testing of a developed questionnaire within the Cognitive Aspects of Survey Methodology (Collins, 2003). The practical issues involved in using qualitative research to generate items and language for an instrument, and in testing understanding of a pilot version, has been detailed in the context of exploring religious beliefs in older people (Krause, 2002).

2.7.2 Evaluation

A mixed methods approach tends to be used more in health promotion and community development than in health technology assessment (Murphy et al., 1998). However, three types of evaluation which make use of mixed methods are outlined by Murphy *et al* in their review of qualitative methods in health technology assessment – formative and evaluative, process and outcome, and impact evaluation (Murphy et al., 1998).

In the first type of evaluation, formative evaluation focuses on helping the service under evaluation to learn and improve, and summative evaluation focuses on judgement about that

service (Bate & Robert, 2002). Formative evaluation makes more use of qualitative methods while summative evaluation is outcome oriented and heavily reliant on quantitative assessments of success, with an emphasis on quantitative data supplemented by qualitative data. In the second type of evaluation, it is becoming common in HSR to undertake process evaluations alongside outcome evaluations to understand how people perceive an intervention, why they react to it in the way they do, why it has effects, and the unanticipated consequences of it (Parry-Langdon et al., 2003; Rousseau et al., 1999; Steckler et al., 1992). Integration of qualitative methods in pilot trials is being promoted to help develop the intervention, optimise how it works, and develop an understanding of what makes it work or why it cannot work (Bradley et al., 1999; MRC, 2000). Issues are beginning to emerge in the HSR literature around the most appropriate models to use e.g. whether to include control groups in a process evaluation (Parry-Langdon et al., 2003; Rousseau et al., 1999), and the challenges of undertaking this approach (Riley et al., 2005) e.g. the need for a process data-monitoring committee to determine if a trial or intervention should be adapted if the process evaluation finds out something is not happening as required. The third type of evaluation is impact evaluations which consider the longer term effects of new programmes.

A further type, which has emerged since Murphy *et al's* report, is where qualitative methods have been used within randomised controlled trials to improve the application of the trial methodology in the real world (Donovan et al., 2002).

2.7.3 Field work and surveys

Much has been written about the combination of in-depth interviews and surveys in social research (Fielding & Fielding, 1986; Sieber, 1973). Many of the roles of methods itemised in Box 2.1 are related to this type of research.

Implications for HSR

1. *Recognising the unique contribution of HSR to mixed methods research -*

Instrument development, evaluation, and surveys with fieldwork are highly relevant to HSR. In HSR, there appears to be a growing interest in mixed methods research in evaluations, with the HSR community making an important and unique contribution to the mixed methods literature in the context of randomised controlled trials.

Implications for this study

1. Considering how mixed methods research is used in HSR in the contexts of instrument development, evaluation, and survey & fieldwork - Rather than simply consider the range of roles of different methods in mixed methods studies in HSR, as proposed in Section 2.6, it may be interesting to consider the different roles of methods in the context of different *types* of research relevant to HSR. Instrument development, evaluation, and survey & fieldwork are relevant contexts for the use of mixed methods research in HSR and it may be useful to consider whether the HSR community is exploiting the potential of mixed methods research within each of these types.

2.8 THEME 6 The purpose of mixing methods

The purpose of *mixing* methods is different from the roles of the individual methods within a study. A researcher can be clear about the role of each method in a study without necessarily being clear about the relationship between methods. Many researchers have described a set of relationships between the methods but Greene et al (1989), in the context of evaluating social and educational programmes, propose the most comprehensive set. They describe five purposes - triangulation, complementarity, expansion, development, and initiation - whilst recognising that multiple purposes may be in operation within a single study (Greene et al., 1989).

Researchers more usually make reference only to triangulation and the complementary use of methods (Barbour, 1999; Poole et al., 1999; Sandelowski, 2000).

2.8.1 Triangulation, confirmation and crystallisation

Triangulation is a frequently cited purpose for mixing methods (Greene et al., 1989). The term originates in surveying and navigation, where two observations are used to plot the location of a third point. In the context of mixed methods research, a qualitative method and a quantitative method are used to study the same phenomenon, and convergence, confirmation or corroboration is sought between the findings from each method. However, it can also be used to describe the combining of qualitative and quantitative methods in a single study, that is as a descriptor of mixed methods studies (Brannen, 1992b; Shih, 1997), as well as describing a way in which the methods work together within a study. Even though the term is widely used in mixed methods literature, it is considered to be problematic within both qualitative research and mixed methods research (Erzberger & Kelle, 2003) for four reasons:

1. There are types of triangulation other than methodological triangulation

Triangulation has been widely discussed in the context of qualitative research. Denzin (1970) proposes four types of triangulation*: data triangulation where data are collected over different time frames, in different places, or include different participants; investigator triangulation where more than one person undertakes the research; theory triangulation where competing theories are used to examine data; and methodological triangulation where the same method is used twice, or different methods are applied to the same situation. Methodological triangulation, where researchers attempt to pinpoint a phenomenon by looking at it from two methodological viewpoints (Ong, 1993), is the type relevant to mixed methods research.

2. It can be misinterpreted as measuring validity

The proposed benefit of triangulation is that it increases confidence in findings because convergent validity can be inferred if the findings from two viewpoints agree (Glik et al., 1986; Poole et al., 1999), and rigour can be claimed (Barbour, 1998).¹ For example, Seiber (1973) proposes that qualitative research might be used to validate survey data. However, it is considered problematic if triangulation is used to infer validity (Barbour, 1998; Bloor, 1997; Bryman, 1992; Fielding & Fielding, 1986). It is considered highly unlikely that two methods are tapping the same issues even when used to explore the same thing (Bryman, 1992). Different methods have different strengths and weaknesses and might be expected to bring different understandings rather than simply reinforce each other (Barbour, 1998). The uncovering of divergent findings in the context of validity may be problematic; if different methods give conflicting results then one method must be privileged over the other without any clear idea of which it should be (Barbour, 1998). In fact, Chelsa (1992) notes that a difference in methods may account for any difference in findings, for example research participants offering a public or private face depending on the research method used to gain their views.

¹ In discussions of triangulation, reference is often made to Campbell and Fiske's multitrait-multimethod matrix for assessing the construct validity of a set of measures **Campbell, D. and Fiske, D. (1959)**, 'Convergent and discriminant validation by the multitrait-multimethod matrix', *Psychological Bulletin*, 56, 81-105. Campbell promoted the concept of triangulation, and the need for multiple methods, but the multitrait-multimethod matrix has limited relevance to mixed methods because it requires the quantitative measurement of every concept or trait using every method in order to produce a correlation matrix.

3. It can be used to describe more than confirmation

Triangulation is a much used term in nursing research (Twinn, 2003) and can be used to describe not only where results converge, but where they complement and contradict (Erzberger & Kelle, 2003). Sandelowski (1995) considers the term to be misused to indicate completeness, where different methods highlight different aspects of a phenomenon, and asks that the term be used with more care to indicate a strategy for confirmation within a paradigm where it is seen as appropriate for one source of information to corroborate another. Then, if triangulation is not the aim, there is no need to be concerned about whether one part of a study contradicts the other (Mason, 1994). 'Confirmation' is proposed as a better term to use than triangulation (Morgan, 1998; Shih, 1997) and it is suggested that care may be needed to consider in detail why confirmation is expected, in what ways, and whether there is intention to privilege one data source over another.

4. It may limit the benefits derived from using a mixed methods approach

There is concern that a reliance on classic triangulation may lead people to pick out the points of similarity whilst ignoring differences (Fielding & Fielding, 1986), although some researchers have used triangulation to focus on both convergent and divergent findings (Glik et al., 1986). In fact, some researchers may have the intent of triangulation but end up exploring the complementary aspects of both methodologies (Glik et al., 1986). Greene et al. (1989) found this when they looked at a number of mixed methods studies – authors described a purpose of triangulation but the methods actually complemented each other, and classic triangulation was rarely used in the context of evaluative studies in education (Greene et al., 1989).

Given that researchers use the term triangulation to communicate either confirmation or a dynamic approach of looking for convergence, divergence and complementarity, it is probably best to avoid using the term, or at the very least take care to explain the meaning being applied. The term 'confirmation' can be used to communicate the classic understanding of triangulation and 'crystallisation' to communicate the latter more dynamic approach to comparing findings from methods (Barbour, 1998). This latter term draws on Richardson's imagery of a crystal (Sandelowski, 1995) which is multifaceted, allowing one to see something from different viewpoints and consider the contribution of each method. Crystallisation may be a more accurate description of what happens in practice in mixed methods studies because it is likely that when using methods with the intent of completeness, researchers may unintentionally obtain confirmation (Coyle & Williams, 2000), and when using methods for confirmation they

may obtain conflicting findings which require further exploration to lead to a deeper understanding of the issue under study (Brannen, 1992b). This unplanned aspect of mixed methods studies has been documented (Bryman, 2001; Glik et al., 1986).

2.8.2 Complementarity, expansion and completeness

Another commonly cited purpose of mixing methods is complementarity (Greene et al., 1989), where different methods are used to answer different questions (Brannen, 1992b). The term is taken from physics where it denotes the capacity of theories together to explain all of a phenomenon while separately only accounting for some of it. Researchers have suggested that qualitative methods can complement quantitative ones because they can be used to address different types of questions (Pope & Mays, 1995). Using both qualitative and quantitative methods allows an issue to be addressed more widely, more completely, and more comprehensively (Morse, 2003). Mason gives a good example of two data sets being used to collect different types of information – a survey to collect how common certain public viewpoints were, and interviews to work out what people did in practice and why (Mason, 1994).

The term 'complementarity' is sometimes used to refer specifically to where one method is used to fully elaborate, illuminate or explain the results of another (Greene & Caracelli, 1997a; Greene et al., 1989) and 'expansion' used where different methods address different components of a study (Greene et al., 1989). However, some researchers have found it difficult to make this distinction in practice (Rossman & Wilson, 1994). Where the purpose is complementarity in its more general sense, different methods can contribute to 'descriptive complementarity', that is doing a better job of describing the impact of an intervention, and 'explanatory complementarity', that is unpacking explanations for findings (Stecher & Borko, 2002). Some researchers propose that methods can only be complementary because they are embedded in different paradigms (Morgan, 1998; Sale et al., 2002).

2.8.3 Development or facilitation

The purpose of one method can be to develop another by assisting in the design of the next step (Ong, 1993), for example to guide further sampling, data collection or analysis (Sandelowski 2000). Qualitative methods can be used to develop survey instruments or questionnaires, or statistical regression can be used to identify cases for in-depth qualitative study. This is sometimes called facilitation (Hammersley, 1996).

2.8.4 Initiation, salvaging, and other purposes

The fifth purpose proposed by Greene *et al* is 'initiation' (Greene et al., 1989). This is where the use of two methods leads to a fundamental shift in thinking, such as the reframing of the research question. However, it is difficult to see how this can be an intention of a mixed methods study and rather easier to see that it may unfold as the study progresses.

Another purpose, which would not be planned at the beginning of a study, is where qualitative components are used to salvage quantitative components (Sandelowski, 2000; Weinholtz et al., 1995) or mask their inadequacies (Coyle & Williams, 2000). A review of mixed methods studies called this a 'paramedic quality' p269 where qualitative research appears at the end of a study when an evaluation or programme has failed (Greene et al., 1989). Weinholtz et al (1995) explore two cases where a qualitative study allowed insightful interpretation of a quantitative study that yielded no significant findings, and where a qualitative study detected errors in a quantitative analysis. In the first case, a qualitative study undertaken simultaneously with a quantitative study helped to identify the inadequacy of key outcome measures, the way in which the interventions worked differently from anticipated, and hypotheses for further research. In the second case, answers to open questions did not correlate with a quantitative analysis revealing an error in the administration of the study. This appears to place qualitative research in a good light – as a saviour – and quantitative research in a poor light – as inadequate and prone to error. However, in both cases the quantitative parts were the core of each study, with the qualitative parts as sidelines and happy accidents - "a qualitative safety net in place" p395 (Weinholtz et al., 1995).

Morse (2003) makes the point that mixed methods research should not be a substitute for undertaking good quality mono-method studies. In the above examples one could argue that a pilot phase incorporating qualitative and quantitative methods would have led to better understanding of the outcome measures needed for the main study and a better understanding of how the intervention was used in practice. 'Front loading' the qualitative research may have been of more benefit than concurrent use of the two methods. In the latter example, monitoring of data collection procedures would have identified problems with the quantitative research. However, these examples highlight that qualitative research may offer more substantial explanations which can replace researcher 'shot in the dark' interpretations of quantitative findings (Weinholtz et al., 1995).

Implications for HSR

1. *Engaging with the language around purposes of mixing* - The purposes of mixing methods have been discussed in HSR (Barbour, 1999), but the language of mixing, for example purposes such as 'development' and 'complementarity', is not in common use in HSR. The HSR community could engage with the language here to allow them to express the purposes of mixing methods within their studies.

2. *Understanding the difficulties of using the term 'triangulation'* - There is a need to build on Barbour's work to further communicate to the HSR community the difficulties around using the term 'triangulation' and attempt to replace it with 'confirmation' and 'crystallisation', or simply encourage researchers to describe what they mean by the term if they wish to use it.

3. *Using qualitative research prior to quantitative research to reduce the need for the 'paramedic' purpose of qualitative research* - There is a sense, in the wider literature, of qualitative research being used too late in the process of research and taking a 'saviour', 'paramedic', or 'death knell' role. HSR could learn from this by attempting to use qualitative methods in the earlier stages of studies, for example during pilot phases, to develop the right intervention, instrumentation and research process. In fact, recent recommendations around using qualitative research in evaluations in HSR reflects this 'front loading' approach to qualitative research (MRC, 2000).

Implications for this study

1. *Exploring the purposes of mixing methods in studies in HSR and how researchers describe the purposes of mixing* - If the HSR community has not been exposed to the language of purposes of mixing then this may hinder their use of mixed methods research. It would be useful to explore whether the community is drawing on the full range of purposes of mixing methods and whether they are explicit about the purpose of mixing methods within their studies.

2.9 THEME 7 Integration

Researchers use a variety of terms to describe how methods might work together in mixed methods studies – combining, mixing, integrating, synthesising, adding, interweaving, linking, complementing, merging and blending (Barbour, 1999; Bryman, 1992; McDowell & MacLean, 1998; Punch, 1998; Sale et al., 2002; Sandelowski, 1995). Yet for all the words in use to describe integration, there appears to be a lack of integration in practice. A rather old review of evaluative studies in educational research showed that mixed methods studies tended to keep both the analysis and the interpretation of the different data types separate, rather than attempting integration (Greene et al., 1989). A more recent example of mixed methods evaluation in that field detailed the structural and conceptual barriers which reduced the ‘yield’ from employing mixed methods p565 (Stecher & Borko, 2002), implying that Greene et al.’s findings might be as relevant today as they were over a decade ago. Nor is this lack of integration restricted to educational research - Barbour (1999) implies that there might be problems around its use in health research, in particular that studies combining quantitative and qualitative approaches treat these components as separate self-contained studies rather than attempting to integrate them. Yet integration is an essential part of some definitions of mixed methods studies (Creswell et al., 2004).

2.9.1 Degree of mixing

The images which researchers draw upon to describe mixed methods research may offer insight into the possibilities for integration within studies. Images used to convey the relationship between the qualitative and quantitative aspects of a study are separate pieces in a jigsaw (Erzberger & Kelle, 2003; Parry-Langdon et al., 2003), a child’s painting by numbers kit (Baum, 1995), and an archipelago where methods are a set of islands which loosely form a group (Lawrenz & Huffman, 2002). These images can imply that the mixing is additive, merely allowing more of the picture or land-mass to be revealed. Yet Barbour (1999) uses the expression ‘the whole greater than the sum of the parts’, implying that there might be something beyond the additive, that is, something transformative² in the mixing of methods. Tashakkori & Teddlie (2003) concur with this view, using the term ‘gestalt’ to describe the way in which inferences made from mixed methods studies can be greater than the parts (p42). This potential to move beyond the two-dimensional, and produce something new from considering the integration of qualitative and quantitative approaches, is reiterated by Sandelowski who asks researchers to move away from the limited image of a triangle – so often used to describe the

² in the context of mixed methods, the word ‘transformative’ is also used to denote emancipatory research, designed to empower marginalised groups.

purpose of mixing methods - to that of the crystal, which communicates the multifaceted nature of mixed methods research (Sandelowski, 1995).

The words researchers use to denote the 'mixing' in a mixed methods study may communicate something about the degree of mixing occurring. 'Merging' and 'blending' denotes loss of individuality for the separate parts of a study, whereas 'integration' denotes creation of a new whole, and 'mixing' denotes mixed-up indiscriminate combination (Sandelowski, 1995). 'Linking' and 'interweaving' might be additions to Sandelowski's dictionary, denoting separate strands which can be brought together at various stages of a study. Generic terms such as 'interaction' or 'synthesis' might be appropriate for describing these different approaches.

2.9.2 When integration can occur

When there are at least two different components in a study, integration may take place from formulating the research question all the way through to writing up (Punch, 1998). Specifically, integration can take place at different stages of a study including sampling, data collection and data analysis, and interpretation (Brannen, 1992b; Sandelowski, 2000). Data can be combined at the analysis stage and findings can be combined at the interpretation stage. The latter type has been shown to be more common than the former in educational research (Greene et al., 1989), leading to consideration of how the few researchers who had gone about integrating data rather than findings did so (Caracelli & Greene, 1993).

Sampling stage

The analysis of data from one method may help to develop the sampling strategy for another method. For example, criterion sampling can be used for a qualitative study by sampling people who have scored 'high' 'medium' or 'low' on a quantitative instrument (Sandelowski, 2000). The purpose may be confirmation to check that the same results are obtained, or complementarity to aid additional understanding of what makes a case obtain a high score (Sandelowski, 2000). An important issue is that both qualitative and quantitative data are available for the same cases.

'Extreme case analysis' is a particular approach, where extreme cases from a quantitative analysis can be used as a sampling frame for a qualitative study. 'Ethnographic residual analysis' is a specific example of this (Fry et al., 1981), where high residuals from a regression analysis are followed up by qualitative study, which is then used to refine the original exploratory regression model (Caracelli & Greene, 1993). This is also known as qualitative residual analysis (Onwuegbuzie & Teddlie, 2003) and has been used to provide greater insights into help-seeking

actions in health care (Rogers & Nicolaas, 1998) and to identify an intervening variable which led to understanding the different sub-groups within a population (Qureshi, 1992). The timing of data collection is usually sequential but it can be concurrent. For example, the interview transcripts of cases not fitting an expected statistical relationship were explored further (Qureshi, 1992).

Analysis stage

Caracelli & Greene (1993) found four strategies for analytic integration in a review of evaluations in the field of educational research. One of their strategies, 'extreme case analysis', is discussed above under 'sampling stage' because although it takes place at the analysis stage of one method, it takes place at the sampling stage of the other method. The other three types of analytic integration are data conversion, typology development, and data consolidation, and are discussed below.

Data conversion

One data type can be converted into the other to allow statistical analysis or thematic analysis of both types together (Onwuegbuzie & Teddlie, 2003; Sandelowski, 2000; Tashakkori & Teddlie, 1998). 'Quantitising' is a term coined for the conversion of qualitative data into numbers and 'qualitising' is the conversion of quantitative data into concepts or themes. An example of 'quantitising' is the coding of a qualitative finding for individuals in a study; this variable can be subjected to statistical analysis. Quantitising may mean coding the presence or not of a theme (0,1) or the strength of presence of a theme (1,2,3,4) (Onwuegbuzie & Teddlie, 2003). Conversion of a qualitative theme into a quantitative variable for use within a statistical analysis proved useful in the context of a piece of social policy research aiming to understand parents' approaches to caring for their children with learning difficulties (Qureshi, 1992). The reduction of qualitative data to quantitative variables may result in a loss of richness and it should not be undertaken lightly (Miles & Huberman 1994), but here it is recommended *in addition to* the qualitative analysis of the qualitative data. To some extent this is what happens when synthesising findings across many case studies on a similar topic - the researcher completes a questionnaire on each case study and then undertakes statistical tests on tables of one variable against another (Yin & Heald, 1975). Indeed researchers interested in evidence synthesis of qualitative and quantitative studies have described this 'case survey' approach as useful (Dixon-Woods et al., 2005; Mays et al., 2005). An example of 'qualitising' is where portraits are created of types scoring the same on an instrument, for example a typology created using factor analysis (Sandelowski, 2000). It is easier to visualise examples of quantitising than qualitising but other examples of qualitising have been described (Onwuegbuzie & Teddlie, 2003).

Typology development

The analysis of one data type may yield categories which are then used to analyse the other data type. For example, conceptual dimensions resulting from an analysis of quantitative data – perhaps from a factor analysis – may be used to develop the themes by which a qualitative data set is coded; or a typology developed in a qualitative analysis may be used to create an explanatory variable in a quantitative analysis. This might lead to more theoretically grounded sub-group analysis of large quantitative datasets (Onwuegbuzie & Teddlie, 2003). This approach has been used in evidence synthesis, where qualitative research and quantitative research were reviewed separately, and the integration of findings considered (Thomas et al., 2004). Sub-groups identified in the qualitative review explained heterogeneity in the quantitative review. Iteration, where the typology is developed and refined, through movement backwards and forwards between data sets, is a potential feature of this analysis strategy (Caracelli & Greene, 1993).

Data consolidation

Qualitative and quantitative data can be jointly reviewed to create new variables or data sets. Here, a quantitative data set is not augmented solely with the addition of converted qualitative data, as detailed above, but rather new variables are created through a merging of qualitative and quantitative data. Caracelli & Greene (1993) give examples of evaluations which have engaged in this type of integration. In one of them, a researcher who used this approach called it a ‘spiral effect’ when the combination of qualitative and quantitative work produced a new variable which was then tested in a regression. In another study, the author discussed ‘weaving together’ the influences from each data set, again to derive a new variable which had not been considered in each separate analysis. This approach is believed to lead to insights unavailable to single method studies (Qureshi, 1992).

The interpretation stage

One approach to integration is to analyse the data from different methods separately and then integrate the separate findings in the discussion of any report or article. Two approaches are possible: first, inferences can be made from each component and then a meta-inference undertaken; second, results can be brought together for inference (Teddlie & Tashakkori, 2003). This may occur if the purpose of the study is either classic triangulation, where different methods are used to investigate the same issue and confirmation is expected; or if the purpose is complementarity, where different methods are used to investigate different aspects of an issue.

The use of crystallisation is highly relevant here, where findings from different components of a study are compared and contrasted, looking for convergence, divergence and discrepancy (see Section 2.8). Approaches discussed in the context of synthesis of qualitative and quantitative evidence, such as narrative synthesis, may be relevant here (Mays et al., 2005).

Publication stage

Findings from different components of a study may be published together to communicate the wider picture accessed by the mixed methods approach. In some cases one method can be so supplementary that it is only publishable as part of the wider study (Morse, 2003). However, with some mixed methods studies, the researcher may publish parts of the study separately. In this case one could argue that part of the benefit of undertaking the components together may be lost.

Research community

The focus of this study is mixed methods research in the context of a single research study. Although not directly relevant, it is worth noting that integration might occur within the research community, where methods can be 'mutually enriching partners' (Baum, 1995). Practitioners of one methodology can learn from the other and take on a way of doing something accepted in the other. Examples might include quantitative researchers adopting reflexivity which is associated with qualitative research (Coyle & Williams 2000), or qualitative researchers synthesising qualitative evidence in the light of the maturity of the synthesis of quantitative evidence in systematic reviews and meta-analysis.

2.9.3 The importance of conflict, discrepancy and contradiction

Many researchers have highlighted the importance of conflict, discrepancy, and contradiction in the findings of mixed methods studies, and this has been labelled 'inter-method discrepancy' (Fielding & Fielding, 1986). It has been suggested that 'initial conflict' is to be expected (Patton, 1990) and that exploration of any conflict is seen as an opportunity for transformation, enrichment and explanation which may lead to further understanding of a phenomenon (Brannen, 1992b). This is a frequently occurring theme in the mixed methods literature (McDowell & MacLean, 1998; Sieber, 1973), as is the opportunity it offers (Mechanic, 1989), and the fact that further investigation is sometimes needed (Sechrest & Sidani, 1995). Yet a review of evaluative studies in education showed that, when data mismatches occurred, there was little discussion of the discrepancies or efforts to resolve them (Greene et al., 1989). This

may be due to a tendency to focus on convergence and see divergence as a challenge to the validity of one or both of the methods or the hypothesis under study (Brewer & Hunter, 1989). 'Initiation' may arise from any apparent discrepancy, for example in one study staff's paternalistic behaviour was cited as a problem in focus groups but only a small percentage cited it as a problem in the survey; this discrepancy led the team to consider who felt this and realised it was minority ethnic groups using the service (Waysman & Savaya, 1997). Although this is discussed mainly in the context of discrepancy between *findings*, there may also be discrepancy between qualitative data and quantitative data on the same individual (Campbell et al., 2003).

Both qualitative and quantitative approaches have been proposed for addressing any apparent disagreement between findings of a mixed methods study, and these are discussed below.

Qualitative approach: further investigation

When addressing apparent discrepancies between findings in mixed methods studies, it has been suggested that care is taken to consider whether the findings really contradict each other (Brewer & Hunter, 1989). Mason (1994) cautions that confirmation and contradiction are not relevant unless the methods are intended to validate each other, that is, that the purpose of the study is classic triangulation. Indeed it is also argued that contradictions cannot be revealed when studies have the purpose of complementarity (Stecher & Borko, 2002). However, apparent contradictions do occur in practice even when the purpose of the mixing of methods is complementarity (Moffatt et al., 2006) and may need to be addressed.

One approach to dealing with inter-method discrepancy is simply to privilege one source of data over the other. In social research, it has been noted that there can be a tendency to regard qualitative evidence as more trustworthy than quantitative data due to its closeness to the subject of the research (Bryman, 1992), whereas in health research, quantitative evidence might be privileged because it is seen as objective. Thus findings can be received with varying degrees of credibility because of the preferences of members of a research team for a particular method (Patton, 1990).

An alternative approach is that researchers attempt to leave these prejudices aside and, instead, go down new lines of enquiry. Researchers can attend to the different epistemologies underlying methods when comparing results (Brewer & Hunter, 1989; Fielding & Fielding, 1986) and consider the strengths of different methods. For example, in a mixed methods study, the sampling for the qualitative method may be different from the quantitative method, with the former making no claims to representativeness which is the strength of the latter; and the findings may depend on this difference. Or further investigation might result in the need to undertake one part of the study again because of concerns about the quality or validity of either

the quantitative or the qualitative methods (Erzberger & Kelle, 2003; Morse, 2003). For example, divergence may highlight that a survey failed to collect information on a particular issue because it was not based on qualitative research in the first place, as is recommended practice (Bryman, 1992). Or further investigation might identify the need for more data collection, although consideration would be needed of whether more quantitative or qualitative data, or both, were required (Bryman, 1992). Or it might result in engagement with the complexity and detail of the results, seeing the subtleties and nuances, and getting closer to the complex way in which variables interact (Stecher & Borko, 2002). For example, treating interview data as accounts or a public expression of views compared with survey data as a more private expression of views, may help researchers to understand that the results are not really contradictory (Chesla, 1992; Fielding & Fielding, 1986; Perlesz & Lindsay, 2003). Or discrepancy may return researchers to the theoretical assumptions upon which the study is based, and bring about a reassessment of them. An example of this is where interviews undertaken after a survey showed that the system evaluated in the survey did not work in the ways anticipated and that views expressed in the survey needed to be interpreted in the light of the realities of the system (Erzberger & Kelle, 2003).

From the discussion so far, it might appear that addressing any discrepancies is a straightforward issue. However, it assumes that the criteria for determining whether one result contradicts another, or whether one merely embellishes the other, are clear (Bryman, 1992). Researchers may also wish to avoid any apparent discrepancy in their studies by keeping findings from different methods separate in any report and by publishing findings from different components in separate articles (Stecher & Borko, 2002).

Quantitative approach: 'results synthesis'

When evaluating services or interventions, researchers may be expected to give that service a 'thumbs up' or 'thumbs down'; that is, present a bottom-line summative conclusion. If different methods produce different results, then this conclusion may be difficult to arrive at in practice, and may also be difficult to justify (McConney et al., 2002). Researchers have questioned whether findings from different methods should be weighted, and on what basis this should occur. McConney et al (2002) propose the method of 'results synthesis' for use within a single evaluation especially when data divergence is evident and unlikely to be resolved. This involves a four-step process: the first involves rating the direction and size of the programme effect emerging from each method for different objectives of the programme; the second involves attaching a value to each piece of evidence based on whether the data are accurate/credible, reliable/dependable, relevant, and representative; the third involves calculating the effectiveness of the programme in meeting each goal by multiplying the rating from Step 1 by the value in Step 2, resulting in a programme effectiveness estimate for each goal; the final step

involves averaging the estimates for each goal to arrive at a summary programme effectiveness estimate.

Other researchers disagree with this approach, feeling that judgement and creativity are needed rather than mathematical formulas to weigh findings (Chesla, 1992; Morse, 1991). The authors of 'results synthesis' themselves highlight some of the challenges facing it. They highlight the importance of considering who should be involved in this process and suggest that the research project advisory panel, and stakeholders such as funders, providers and users, are involved (McConney et al., 2002). They recognise that the criteria used may change depending on the programme under evaluation, or the team which creates them, and that weights may need to be attached to sources of evidence. They also advocate that evaluators attempt to reconcile divergence through further investigation of the data and findings as discussed earlier, and thus do not promote it as a substitute for the more qualitative approach described above, but as complementary to it. They emphasise that it is only needed if a bottom-line assessment is required in the context of divergent results. For all the problems associated with it, the authors believe that at least the process is systematic, collaborative and transparent.

Similar approaches have been suggested by other researchers, but with a less mathematical formula and paying attention to epistemological issues. Each method is undertaken separately and then findings are put alongside each other in a table. The rigour and the strength of evidence of each finding is considered and then the researcher constructs multiple conceptual models to explain the findings. This is known as 'conceptual triangulation' (Foster, 1997). Another approach is less formal and involves setting out how an intervention is supposed to work and displaying any qualitative or quantitative results to allow one to look for consistency and inconsistencies between findings from different methods (Cooksy et al., 2001).

2.9.4 Technical approaches to integration

Techniques are available which may facilitate integration. These may differ depending on whether qualitative and quantitative data are available for the same cases or available for different cases.

Both types of data are available for the same cases

Sometimes, both quantitative and qualitative data are available for some individual participants or organisations participating in a study. In this circumstance all the data *on an individual* can be studied together, for example comparing one person's answers to a questionnaire with their interview transcript, and looking for contradictions within individuals (Fielding & Fielding,

1986). This 'within case' analysis has been used by linking diary, survey and in-depth interview data (Rogers & Nicolaas, 1998). Miles and Huberman's 'meta-matrix' approach may be useful to display qualitative and quantitative data on the same page for each case (Miles & Huberman, 1994), thus allowing one to look for patterns and pay attention to surprises and paradoxes (Wendler, 2001). This can be done for each individual and then patterns can be studied across individuals in a qualitative cross-case analysis (Miles & Huberman, 1994).

When both types of data are available for a group of participants, qualitative data may be quantified to allow comparison of qualitative and quantitative data for each individual (Campbell et al., 2003). One could even correlate both types of data to test a hypothesis, and calculate a correlation coefficient if this is helpful (Onwuegbuzie & Teddlie, 2003). This approach might draw on techniques for analysing multiple case studies where qualitative and quantitative data are available, and is similar to some techniques described as useful in the context of synthesising evidence across qualitative and quantitative studies (Dixon-Woods et al., 2004; Mays et al., 2005). In particular, as discussed previously, the case survey is relevant. This is where a group of existing case studies are collected, a coding frame designed to convert all information within case studies to quantitative data, and coded data are analysed statistically (Larsson, 1993). Also relevant is Qualitative Comparative Analysis where Boolean algebra is used to classify a variable as present or absent within each case, allowing across case comparisons to be made in qualitative data (Ragin, 1999).

Qualitative data and quantitative data are available for different cases

When both types of data are not available for the same individuals, one approach is to move back and forth between the two data sets. For example, one could develop a hypothesis from the interview data and follow it up in questionnaire data to see if it holds (Fielding & Fielding, 1986). Or one could follow up similar themes in the different data sets by taking a topic and exploring what each data set could contribute to it while asking appropriately limited questions of each data set (Mason, 1994). Mason (1994) discusses the integration of two data sets at the analysis stage of a study - a survey designed to collect publicly expressed views on family obligations and estimate the prevalence of those views, and an interview study to explore what people did in practice. She is clear that triangulation was not the intention of her study, but that the purpose was complementarity. She is explicit about her theoretical position by positing the survey as examining 'what ought to be done' and the interviews as examining 'what is actually done and why'. This weaving back and forth among methods does not happen very often and may lead to further data collection (Bryman, 1992).

Creating overlap in data collection

A survey instrument may also be used within a qualitative interview to promote relevant discussion and encourage connections between the survey and the interview data (Adamson et al., 2004).

A summary of the ways of integrating discussed so far is presented in Box 2.2.

Box 2.2 Ways of integrating

- A. Method 1 **analysis** affects Method 2 **sampling**. The same cases are available for joint consideration.
- B. Method 1 **data converted** and Methods 1 and 2 **data analysed together**. It is essential that qualitative and quantitative data are available on the same cases.
- C. Method 1 **analysis** affects Method 2 **analysis** by creating a hypothesis to test, or a typology of sub-groups for exploration in the Method 2 analysis.
- D. Method 1 **data** and Method 2 **data** are considered together to produce data consolidation. It is not necessary for qualitative and quantitative data to be available for the same cases.
- E. Method 1 **analysis** and Method 2 **analysis** produce inferences.
- F. Method 1 **inferences** and Method 2 **inferences** produce meta-inferences.

2.9.5 Types of analytic integration relevant to different designs

The type and level of integration may be dependent on the purposes and design of a mixed methods study (Riggin, 1997) and therefore it is helpful to consider integration in the context of different types of mixed methods studies.

Integration for studies with different purposes

Where the purpose of a study is classic triangulation, concurrent and independent data sets are required from different methods. It is important to have two separate methods and analyses so that integration only takes place at the interpretation stage (Sandelowski, 1995), that is, integration of findings rather than data is appropriate (Caracelli & Greene, 1993).

Where the purpose is complementarity, integration of both findings and data can be undertaken. Data conversion is a useful strategy, for example, in a study where qualitative methods are used to collect process issues and quantitative methods are used to collect outcomes, the qualitative data could be quantified and used in a regression analysis. Other integration strategies at the analysis stage are possible, even though they are rarely used (Caracelli & Greene, 1993). In fact, too often studies with a purpose of complementarity keep the qualitative and quantitative components separate, with no integration at analysis or interpretation (Greene et al., 1989).

Where the purpose of mixing is development, integration is built in to the study design. An intervention or instrument can be developed using qualitative research and undergo preliminary testing using quantitative research. Analysis of the first method affects the conduct of the second method. It seems unlikely that integration of findings through crystallisation would be necessary, although concerns about the ability of an instrument to capture all insights from qualitative research (Section 2.7.1) suggest that some crystallisation of findings from both components might be useful.

Integration where the timing of the methods is sequential or concurrent

In sequential designs, typology development, extreme case analysis, (Caracelli & Greene, 1993) or one method explaining the results of the other might be most useful (Creswell et al., 2003a). In concurrent designs, where the methods are undertaken at the same time, analysis occurs after all the data are collected (Onwuegbuzie & Teddlie, 2003), and integration can take place at both the analysis and the interpretation stage. Where one method dominates, Morse suggests it is best to work with as few data sets as possible and recommends data conversion (Morse 2003).

2.9.6 Computer software for integration

In theory, integration might be facilitated by a 'mixed methods software'. There is no mixed methods software available that provides a comprehensive set of tools to cover both qualitative and quantitative analysis (Bazeley, 2003). However, user demand has prompted that software

designed for one methodology are being extended to accommodate the analysis of the other type of data (Bazeley, 2002; Bazeley, 2003). In the meantime, researchers undertaking mixed methods studies can use quantitative software to analyse quantitative data, and qualitative software to analyse qualitative data. This 'side by side' use offers convenience and efficiency (Bazeley, 2003). Additionally, one form of data can be converted and analysed in the other type of software (Onwuegbuzie & Teddlie, 2003). For example, qualitative codes can be put into SPSS for each case, and sorted to look for patterns using cross tabulation. In the future, computers may allow researchers to do more and this may result in unexpected changes within mixed methods research (Qureshi, 1992). However, as with all types of research, the role of the researcher remains paramount in making decisions about analyses and it is important to see any software as an aid rather than a solution to integration.

Implications for HSR

1. Informing the HSR community about different approaches to integration - There is a concern in the educational research literature that few researchers exploit the potential of integration. Examples of integration are not common in the health research literature and it is unlikely that the HSR community know about the different ways in which integration can occur. It may be important to communicate the different approaches to integration to the HSR community.

Implications for this study

1. Assessing the types of integration used in HSR studies - Integration between methods appears to be an important aspect of mixed methods research. One approach to integration is additive, where different methods contribute different parts of a picture, and another approach is transformative, where mixed methods studies might reach the parts that a series of mono-method studies would not. The HSR community may need to draw on the range of approaches to integration in order to fully exploit the potential of mixed methods studies. It would be useful to know what types of integration are used in mixed methods studies in HSR to see whether researchers are fully exploiting the potential for integration.

2.10 THEME 8 Typologies of mixed methods studies

Different approaches can be taken to combining qualitative and quantitative methods. Nonetheless, a review of mixed methods studies in nursing showed a lack of attempt to identify distinctions in mixed method design, with almost universal reliance on the term ‘triangulation’ (Twinn, 2003). It has been proposed that distinguishing between the different types of mixed methods studies that can be undertaken, and using a typology to communicate these different types, could give the field of mixed methods an organisational structure, help to legitimise the field by showing that mixed methods designs are distinct from other designs, help to establish a common language, show the variety of paths a researcher might take to meet a goal, and offer a useful teaching tool (Teddlie & Tashakkori, 2003).

When attempting to distinguish different types of mixed methods studies, some researchers have proposed using the purpose of mixing such as triangulation, facilitation and complementarity (Hammersley, 1996). However, a number of researchers have devised *typologies* of mixed methods studies (Caracelli & Greene, 1997; Creswell, 2003; Miller & Crabtree, 1994; Morgan, 1998; Morse, 2003; Patton, 1990; Rossman & Wilson, 1994; Steckler et al., 1992; Tashakkori & Teddlie, 1998). A typology is a classification where categories are discrete and independent, where all cases are allocated to only one category in the typology (Ritchie et al., 2003), and where categories are usually multidimensional, that is having two or more dimensions combined to give a more refined picture. There are similarities, differences and contradictions between the typologies devised in mixed methods research, and no consensus about which might be best. Some researchers hold the view that the search for ‘the best’ typology is futile because it may be necessary to have more than one typology to cover the variety of contexts in which mixed methods studies can be undertaken (Tashakkori & Teddlie, 2003). Existing typologies are described below in the order of the timing of their publication because some typologies make use of categories from earlier typologies.

2.10.1 Patton (1990)

As well as two mono-method approaches, Patton (1990) proposes four mixed methods approaches in the context of evaluation. The thrust of the typology is the separation of the design, data collection, and analysis stages of a study, where one methodological approach can be used at one stage, and the other approach at a different stage. The four types are:

- a quantitative design (such as a randomised controlled trial) is used but all data collection and analysis is qualitative
- a quantitative design (such as a randomised controlled trial) is used but data collection is qualitative and the data are quantified for statistical analysis
- a qualitative design (such as an interview study) is used and all data are collected qualitatively, but are quantified and analysed statistically
- a qualitative design is used but data are collected quantitatively for statistical analysis.

Patton expresses concern about mixing parts of different approaches, but argues that it may be the best way of evaluating a particular service. He also feels it is possible to 'quantitise' qualitative data but not possible to qualitate quantitative data into detailed description. This typology is based on intra-method mixing and so is not applicable to the definition of mixed methods research used in this study due to the lack of two components of data collection and analysis.

2.10.2 Steckler et al (1992)

Steckler *et al* (1992) consider the ways in which qualitative and quantitative research might be integrated in the context of health education research and programme evaluations.

- *Model 1* - Qualitative research helps to develop quantitative measures such as a questionnaire
- *Model 2* - Qualitative research helps to interpret findings of a mainly quantitative study
- *Model 3* - Quantitative research is used to interpret the findings of a mainly qualitative study
- *Model 4* - Two methodologies are used equally in parallel.

This typology considers roles of methods, dominance of methods, and timing of methods.

2.10.3 Miller & Crabtree (1994)

Four different designs are proposed in which qualitative and quantitative methods are integrated (Miller & Crabtree, 1994):

- *concurrent designs* - consisting of two independent studies, for example a randomised controlled trial where qualitative research determines how the intervention works
- *nested designs* - occurring within a single research study, for example narratives from a qualitative study become the key variables to analyse in an epidemiological study; it appears that quantitising occurs but this is unclear
- *sequential designs* - consisting of one method identifying a key variable for use by the following method, or determining the sampling for the following method
- *combination designs* - using any combination of the other three designs.

This typology considers dominance and timing of methods, and recognises that a number of these types may occur within a study.

2.10.4 Rossman & Wilson (1994)

This typology consists of four purposes for combining methods (corroboration, elaboration, development, and initiation) considered in two stages of the research process (design and analysis).

- *Design corroboration* – views from interview data corroborated by routine statistics
- *Analysis corroboration* – units at the extremes of an outcome variable are looked at qualitatively and a key variable in a regression is found to differentiate the two extremes
- *Design elaboration* – interviews are undertaken after a survey to illuminate the results
- *Analysis elaboration* – fieldwork data and interview data on a unit are considered together
- *Design development* – interview data are used to design a questionnaire
- *Analysis development* – interview analysis shapes the analyses of other data
- *Design initiation* – researchers are open to divergent findings which may challenge the conceptual framework of the study
- *Analysis initiation* – results from one method challenge interpretation of all the findings.

This typology considers stage of study and purpose of mixing.

2.10.5 Caracelli and Greene (1997)

In the field of education, a seven item typology has been proposed for evaluative designs (Caracelli & Greene, 1997). First, designs are separated into component designs and integrated designs. In the former, the methods are implemented as discrete aspects of the design, with combining occurring at the interpretation and conclusion stage only. With integrative designs, there is integration of elements of different paradigms, for example 'embedded' or 'nested' designs where one methodology is embedded in another, such as an ethnographic study with a small experiment within it.

- *Component triangulation design* - different methods are used to assess the same phenomenon for convergence and increased validity
- *Component complementarity design* - results from one method are used to enhance or clarify the results from another method
- *Component expansion design* - different methods address different aspects of an issue
- *Integrative iterative design* - results from one method inform the design of another, or multiple iterations which can spiral to a sophisticated understanding
- *Integrative embedded or nested design* - one methodology is embedded in another, e.g. an ethnographic study with a small experiment within it
- *Integrative holistic design* - methods are used simultaneously rather than taking turn, with an overall concept map e.g. a needs assessment
- *Integrative transformative design* - the rationale for mixing methods is ideological to represent pluralistic diverse views, e.g. participatory or action-research

This typology considers degree of integration, purpose of mixing, timing of methods, dominance of methods, and justification for mixing.

2.10.6 Teddlie and Tashakkori (1998)

When describing the emergence of mixed methods studies between the 1960s and 1980s, these authors acknowledge Creswell's original 1995 typology and add a multilevel type to it:

- *Equivalent status sequential designs* (QUAN→QUAL and QUAL→QUAN)
- *Equivalent status parallel designs* (QUAN+QUAL and QUAL+QUAN)
- *Dominant/less dominant sequential designs* (QUAL→quan and QUAN→qual)
- *Dominant/less dominant parallel designs* (QUAL+quan and QUAN+qual)
- *Multilevel use of approaches* (different types of methods at different levels of data aggregation e.g. QUAN at student level, QUAL at class level, and QUAN at school level).

This typology considers dominance of methods, timing of methods, and levels of data aggregation. The notation used has been devised by Morse (see Section 2.10.10 for explanation). The authors then include 'mixed model' studies which engage in the use of different approaches at each stage of a study as originally espoused by Patton (Patton, 1990). A design can be either a single application design, where data are collected qualitatively and converted for quantitative analysis, or multiple application where closed and open questions are asked on a questionnaire, say.

- Single application within stage of study (each approach in at least one stage)
 - Type of inquiry is QUAL or QUAN (exploratory or confirmatory)
 - Data collection/operations is QUAL or QUAN
 - Analysis or inference is QUAL or QUAN (qualitative and statistical analysis)

- Multiple applications within stage of study (both approaches in at least one stage)
 - Type of inquiry is QUAL and/or QUAN
 - Data collection/operations is QUAL and/or QUAN
 - Analysis or inference is QUAL and/or QUAN.

They then produce a taxonomy of *mixed model* studies:

Type I -	Confirmatory investigation, qualitative data/operations and statistical analysis and inference = qualitative data are quantitised
Type II -	Confirmatory investigation, qualitative data/operations and qualitative analysis and inference = hypothesis testing using qualitative study
Type III -	Exploratory investigation, quantitative data/operations and statistical analysis and inference= inductive quantitative study
Type IV -	Exploratory investigation, qualitative data/operations and statistical analysis and inference= qualitative data are quantitised
Type V -	Confirmatory investigation, quantitative data/operations and qualitative analysis and inference = quantitative data are qualitised
Type VI -	Exploratory investigation, quantitative data/operations and qualitative analysis and inference = quantitative data are qualitised
Type VII -	Parallel mixed model: mixing within phases of a study
Type VIII -	Sequential mixed model: mixing across phases of a study.

Finally, these authors go on to update this typology in 2003 to include mono-strand and multi-strand mixed model studies (Teddlie & Tashakkori, 2003). In mono-strand studies, data are collected qualitatively say and quantitised for statistical analysis. That is, only one research method is used whereas in multi-strand designs more than one research method or data collection procedure is used. Only the latter are of relevance to this study and types of multi-strand designs include:

- Concurrent mixed designs -
 - a. Concurrent mixed method: data are collected separately at the same time, analysed separately, and brought together in the interpretation of results.
 - b. Concurrent mixed model: data are collected separately at the same time, analysed separately, inferences are drawn separately, and meta-inference takes place.
- Sequential mixed designs -
 - a. Sequential mixed method: analysis of one method affects the data collection of the next method.
 - b. Sequential mixed model: inferences from one method affect the question posed for the next method.
- Conversion mixed -
 - a. Conversion mixed method: one method of data collection but analysis is undertaken qualitatively and quantitatively for inferences to be drawn.
 - b. Conversion mixed model: one method of data collection is undertaken. A quantitative analysis draws inferences and a qualitative analysis draws inferences. A meta-inference is undertaken.
- Fully integrated mixed model - Mixing takes place at all stages.

This typology is extremely complex, to the point of incomprehension, requiring the reader to distinguish between different applications, strands, and mixed methods or models. It considers the timing of methods, the purpose of the research, and integration.

2.10.7 Morgan's Priority-Sequence Model (1998)

In the health field, Morgan proposes a Priority-Sequence Model which yields four basic designs (Morgan, 1998):

- preliminary qualitative methods in a quantitative study
- preliminary quantitative methods in a qualitative study
- follow-up qualitative methods in a quantitative study
- follow-up quantitative methods in a qualitative study.

Morgan states that the most frequently used design is where qualitative research informs a quantitative design and that the least common and most problematic is where quantitative research follows a qualitative study because it feeds a concern that qualitative research needs to be supplemented and cannot stand alone. He also suggests that it is easier to obtain funding for some designs than others due to wider political and historical reasons. He considers only a complementary approach as the motivation for mixing methods. This typology considers sequential designs only, where one method is dominant.

2.10.8 Creswell (2003)

Creswell (2003) proposes three general strategies, with several variations within them: sequential, concurrent and transformative (Creswell, 2003; Creswell et al., 2003a). Sequential strategies expand the findings of one method with another, for example a qualitative method is used for exploratory purposes and followed by a quantitative method on a large sample for generalisability. Concurrent strategies collect two types of data at the same time and integrate them at the interpretation stage. Nesting of one method within another may occur. Transformative strategies apply a particular theoretical lens, where the research is value-based, action-oriented research, and emancipatory.

- *Sequential explanatory design* - the study is mainly quantitative, with the quantitative method undertaken first. The qualitative study explains the quantitative study when unexpected results arise. Integration takes place at the interpretation stage. Methods can be equal partners.
- *Sequential exploratory design* - the study is mainly qualitative, with the qualitative method undertaken first. The quantitative study assists in interpretation of the qualitative study, particularly generalisation. Integration takes place at the interpretation stage.

- *Sequential transformative design* – two distinct phases of data collection, with integration at the interpretation stage. A theoretical perspective guides the study. Little is known about how these work in practice.
- *Concurrent triangulation strategy* - one method is used to offset the weakness of another. It is used to validate findings. The priority of each method is usually equal but there can be differing dominance. Integration is at the interpretation stage. There may be difficulties resolving discrepancies.
- *Concurrent nested strategy* - a predominant method guides the project, with the lesser method embedded within. Mixing occurs during the analysis stage. Data collection is simultaneous but transformation of data is needed and little known about how to do it.
- *Concurrent transformative strategy* - this can be the same as the nested or triangulation strategy, but with a specific theoretical perspective.

This typology considers the timing of methods, the dominance of each method, stage of integration of methods, and theoretical perspective of the research.

2.10.9 Morse (2003)

Morse's typology of multi-method designs, where discrete studies using different methods are part of a programme (Morse, 2003), includes eight types – four with an inductive drive and four with a deductive drive. However, some of these do not involve the use of both qualitative and quantitative methods, and only the four mixed methods types are shown below:

- *QUAL + quan* - simultaneous use with an inductive theoretical thrust
- *QUAL → quan* - sequential use with an inductive theoretical thrust
- *QUAN + qual* - simultaneous use with a deductive theoretical thrust
- *QUAN → qual* - sequential use with a deductive theoretical thrust.

The notation used is described in the next section (Section 2.10.10). This typology considers the timing of methods and the dominance of methods.

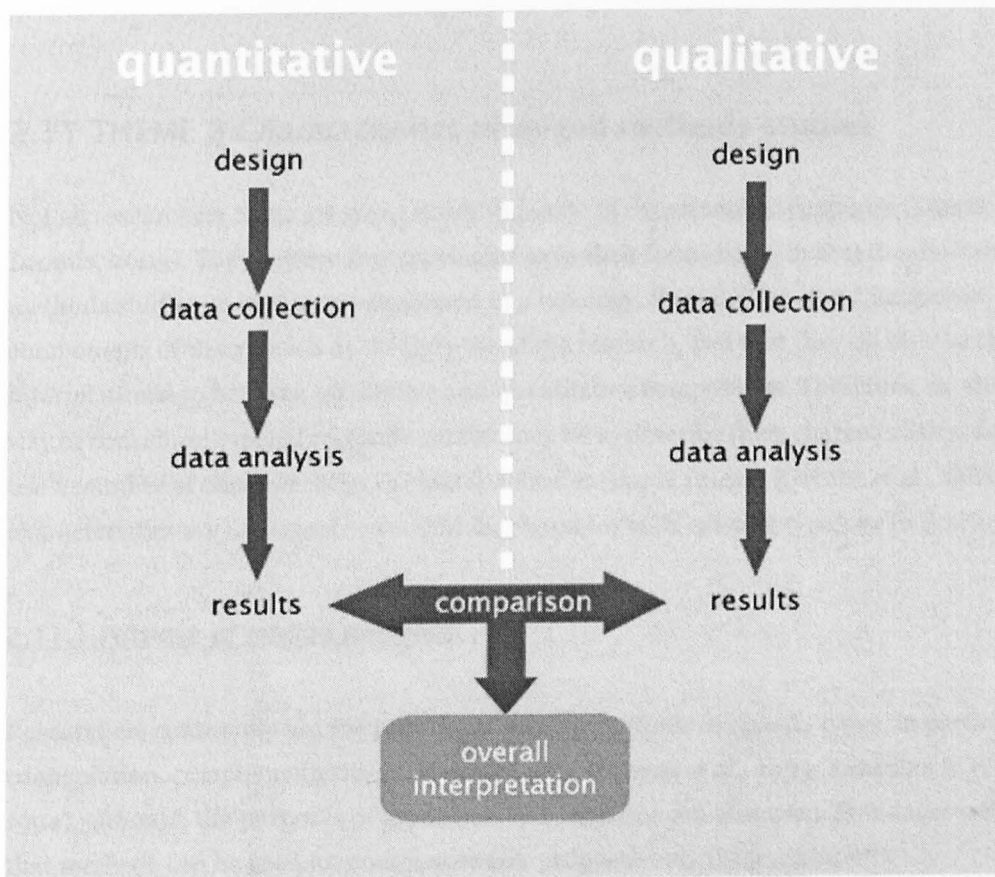
2.10.10 Communicating types: notation and diagrams

Morse (2003) introduced notation for mixed methods studies in 1991, which has been adopted by other researchers (Tashakkori & Teddlie, 1998) and promoted to aid communication

(Creswell et al., 2003a). The uppercase QUAL and QUAN is used to denote the dominance of a method and the lower case to denote supplemental status. '+' denotes that methods are used simultaneously, and arrows denote the order in which methods are used in a sequential approach.

Creswell recommends that research proposals contain visual models of the mixed methods strategy to include the timing of methods, the dominance of methods, integration, and theoretical perspective (Creswell, 2003). This visual display can be used to communicate how a mixed methods study has worked in practice, as well as how researchers intend it to work. In the introduction, a mixed methods study of evidence-based leaflets in maternity care to promote informed choice was described. This involved concurrent use of an RCT to determine the effectiveness of the leaflets and an ethnographic study to consider how the leaflets worked in practice; integration took place at the interpretation stage of the study, and the theoretical perspective was implicit rather than explicit. An attempt was made to construct a visual model of that study using Morse's notation. However, the diagram lacked comprehension for anyone unfamiliar with the notation. Figure 2.1 is an alternative visual model of how the methods worked together within that study.

Figure 2.1 A visual model of a mixed methods study of an evaluation of evidence-based leaflets in maternity care



Implications for HSR

1. Using typologies in HSR - There is little evidence of discussion of typologies in HSR. Typologies may help researchers to understand the range of types of mixed methods designs available to them and use this range appropriately, or to communicate their intentions and actions within their studies.

Implications for this study

1. Categorising types of mixed methods studies used in HSR - Typologies may help to categorise mixed methods studies in HSR in a way which then allows consideration of whether the HSR community is drawing on the range of *designs* of studies available. Some of the existing typologies may be relevant to HSR and it would be useful to identify these and then apply them to a set of mixed methods studies to identify any gaps in designs used.

2.11 THEME 9 Characteristics of mixed methods studies

Not all researchers advocate going down the route of constructing typologies (Maxwell & Loomis, 2003). They believe that typologies have their limitations, in that the diversity in mixed methods studies cannot be encompassed in a typology, that they leave out important components of design such as the purpose of the research, and that they do little to clarify the interrelationship between qualitative and quantitative components. Therefore, an alternative way of considering mixed methods studies may be to describe their characteristics. Researchers use a number of characteristics to classify mixed methods studies (Greene et al., 1989). These characteristics are discussed below and displayed for each existing typology in Box 2.3.

2.11.1 Purpose of mixing methods

Researchers commonly use the purpose of mixing methods to classify types, in particular triangulation, complementarity and development (Greene et al., 1989; Rossman & Wilson, 1994), although the purposes of expansion and initiation are also used. Some researchers believe that methods can be used for complementary purposes only (Morgan, 1998).

2.1.1.2 Purpose of the study

Other researchers use the purpose of a study, rather than the purpose of mixing methods, to classify types of mixed methods studies. A study may be explanatory or exploratory (Creswell et al., 2003a; Tashakkori & Teddlie, 1998), an evaluation might be formative or summative (Greene et al., 1989), or a study may be ‘transformative’ – that is, research which is value-based, action-oriented research, with a theoretical stance around emancipation of marginalised groups (Caracelli & Greene, 1997; Creswell, 2003).

2.1.1.3 Timing of methods

The timing of different methods is a key way of classifying type in some typologies, that is, whether methods are used sequentially or concurrently (Creswell, 2003; Miller & Crabtree, 1994; Tashakkori & Teddlie, 1998). Timing is associated with the phases of a study. A concurrent design will have one phase and a sequential design will have at least two phases. Timing of methods has also been used to categorise different ways of using qualitative and quantitative methods outside the context of typologies (McDowell & MacLean, 1998; Rousseau et al., 1999; Sieber, 1973).

2.1.1.4 Priority or dominance

The priority (Morgan, 1998), dominance (Tashakkori & Teddlie, 1998), or status (Greene et al., 1989) characteristic distinguishes which, if any, method is the main focus of the study. This is described in different ways by different researchers, distinguished on the theoretical drive of the study rather than the paradigm or the resources given to each approach, that is, whether theory is developed inductively or used deductively (Creswell et al., 2003b; Morse, 1991); the relative weight and influence of the qualitative and quantitative methods in relation to their frequency and centrality to the study objectives (Greene et al., 1989); the principal tool for gathering data (Morgan, 1998), and what is emphasised first in the study (Creswell et al., 2003b). Studies can be predominantly qualitative, predominantly quantitative, or methods can have equal status. ‘Nesting’ is relevant to a dominant design, where a dominant method guides the project with the lesser method embedded within (Creswell, 2003). Some researchers have associated status with the contribution made by a component within a study. For example, qualitative research may be in a supporting and supplementary role to help develop a questionnaire, or in addition to this supportive role may also operate as a standalone component to “make a separate but complementary contribution to the literature” p19 (McDowell & MacLean, 1998).

2.11.5 Stages of a study

Different methods can be used at the stages of design, data collection and analysis (Patton, 1990). In particular, integration can take place at different stages of a study, such as data collection, analysis and interpretation. Combinations of methods have been discussed in the context of design, data collection and analysis outside discussions of typologies (McDowell & MacLean, 1998; Sieber, 1973).

2.11.6 Type of integration

Some typologies describe the type of integration as well as the stage at which it occurs within a study. In the context of evaluation, a distinction has been made between 'mixed-method component' designs and 'mixed-method integrated' designs (Caracelli & Greene, 1997). In the former, the methods are implemented as discrete aspects of the design, with combining of findings occurring at the interpretation and conclusion stage only. With integrative designs, which are less common than component designs, there is integration of elements of different paradigms and data conversion can be undertaken.

2.11.7 Levels within a study

A study can occur at more than one level, for example research can be undertaken at an organisational level and an individual level. Analysis may use multi-level modelling. This type of study is called 'multilevel' (Tashakkori & Teddlie, 1998), where qualitative research is used to capture issues at the more macro levels such as a school or a hospital department, while the quantitative research is used to capture issues at the individual level of students or patients.

Implications for HSR

1. Understanding the different characteristics of mixed methods studies -

Understanding the characteristics of mixed methods studies may help the HSR community to communicate their intentions and their actions within their studies. There is a need to inform the HSR community about the different characteristics which may be useful to them.

Implications for this study

1. Describing the characteristics of mixed methods studies in HSR - It may be helpful to consider the characteristics of mixed methods studies in HSR to help to determine how mixed methods are used in HSR and any gaps in use which can be further exploited.

Box 2.3 A comparison of mixed methods typologies

	Patton (1990)	Steckler (1992)	Miller & Crabtree (1994)	Rossman & Wilson (1994)	Greene & Caracelli (1997)	Teddlie & Tashakkori (1998)	Morgan's Priority- Sequence Model (1999)	Creswell (2003)	Morse (2003)
Number of types	4	4	4	8	7	13	4	6	8
Purpose of mixing		Development Interpretation		Development Corroborating Elaborating Initiating	Triangulation Complementarity Expansion		Complementary	Triangulation	
Purpose of study						Exploratory Confirmatory		Exploratory Explanatory Transformative	Inductive Deductive
Priority		Dominance- equivalence				Dominance - equivalence	Dominance essential	Dominance important in some designs	Dominance essential
Timing			Sequential Concurrent Nested Combination		Iterative Embedded/nested	Sequential Concurrent	Sequential	Sequential Concurrent Nested	Sequential Concurrent
Integration	Conversion	Findings only	Conversion	Findings Data	Component Integrative	Mixed model		Conversion Findings Data	
Stage	Design Data collection Analysis			Design Analysis		Design Data collection Analysis		Data collection Analysis Interpretation	
Field	Evaluation	Health education	Health		Evaluation	Educational psychology	Health	Education	Health

2.12 THEME 10 Quality

Researchers have expressed concern about a perception amongst some researchers that there is an inherent good in mixed methods (Twinn, 2003). Yet users of research need to know whether they can trust the findings of a mixed methods study; commissioners of research need to know that they have funded a high quality mixed methods study; and evidence synthesisers of mixed methods studies need to be able to judge the quality of a study for inclusion in a synthesis. How can each of these groups judge the quality of a mixed methods study? The quality of some types of quantitative research (Jadad et al., 1996), and of qualitative research in general (Murphy & Dingwall, 1998), has been considered; quality criteria have been discussed and checklists sometimes constructed. Some researchers have explicitly discussed the quality of mixed methods studies (Caracelli & Riggan, 1994; Creswell et al., 2004; Sale & Brazil, 2004; Teddlie & Tashakkori, 2003) or quality is implicit when researchers consider some of the challenges of designing and implementing these studies (Brannen, 1992b; Datta, 1997; Stecher & Borko, 2002).

2.12.1 Different approaches to assessing quality

A distinction has been made between methodological rigour and interpretative rigour when discussing the quality of mixed methods studies (Teddlie & Tashakkori, 2003). Quality has also been discussed in the context of 'success', where the commissioner of the research considers whether their money was well spent (Datta, 1997). These three approaches are considered below.

Methodological rigour

Methodological rigour can be considered in the context of the individual methods, the mixing of methods, and the integration of methods.

(a) Quality of the parts - One approach is to assess whether each method used meets the appropriate criteria for rigor for that method (Morse, 1991; Sale & Brazil, 2004). Thus, if a survey and in-depth interviews are used, then the quality of the survey is assessed in terms of representativeness of sample and respondents, and the in-depth interview component is assessed in terms of attention to reflexivity and disconfirming cases. The assumption here is that methods are linked to paradigms, quantitative methods to positivism and qualitative

methods to constructivism, and therefore the criteria to assess methods should be linked to paradigms (Sale & Brazil, 2004).

Within a mixed methods study, there may be a threat to the validity of one of the methods. For example, researchers may use the same sample for both the quantitative and qualitative methods, with the use of a sampling technique credible within qualitative methodology leading to the loss of a large, randomly selected, representative sample required for a survey (Morse, 1991). Indeed some researchers consider that methodological rigour may even be a cost of undertaking a mixed methods study (Chen, 1997). For example, researchers may not have the resources to meet the standards of dual rigour for each method: participant observation may result in too short a visit to ensure 'thick description', or there may be too few cases to undertake a quantitative analysis. That is, the attention needed for a number of methods rather than a single method may lead to the production of research, or part of the research, which is underdeveloped and under-analysed (Silverman, 2000). Or each approach may be reduced to their elementary forms, with a lack of sophistication of each of the methods (Steckler et al., 1992). Concerns have been expressed that the qualitative component may be neglected (Deem, 2002). It may also be the case that one component needs to adapt to the presence of the other, which may limit that component. An example of one component affecting the quality of another is where qualitative interviews had to be based around a structured diary and a survey, thus framing the whole interview process (Rogers & Nicolaas, 1998). The expertise of the team may be important here, ensuring that there is expertise in each method available on the team (Creswell et al., 2004), particularly in the context of a concern of poor quality qualitative research emerging from those practising quantitative methodology (Howe & Eisenhart, 1990).

(b) *Quality of the mixing* - A second approach is to focus on the mixing rather than the individual methods. Datta (1997) discusses 'mixed-up models', where researchers lack a theory for mixed methods studies. A good mixed methods study gives justification for why a mixed methods approach is necessary or superior, and gives a clear and appropriate rationale for mixing (Creswell et al., 2004). For example, a study involving the design and application of a questionnaire alongside the use of in-depth interviews may lead to the conclusion that the questionnaire did not cover the issues of importance to respondents or that some questions were misinterpreted by respondents. A sequential development design, of in-depth interviews to inform the design of the questionnaire, may have been a higher quality design than the concurrent complementarity design actually used. As well as giving a rationale for mixing, researchers may also need to explain how the use of mixed methods actually contributed to completeness, confirmation, or development within the study. The promise of mixed methods research may not be fulfilled if it is used mechanically rather than with thought (Wong, 2002).

(c) *Quality of the integration* - A third approach is to focus on integration, including whether it occurs, whether the type which occurs is appropriate to the design used, whether rigour is protected or compromised during integration, and whether time has been allowed for it.

The integration of qualitative and quantitative approaches is a key aspect of mixed methods studies, yet there is evidence that it is rarely considered (See Section 2.9). It would be important to look for intentions for integration in a research proposal and evidence of integration in a study report, recognising that studies may seem less integrated in a report than they were in practice, unless researchers publish candid in-depth accounts (Maxwell & Loomis, 2003).

Some approaches to integration may be appropriate for some types of mixed methods studies only. Where the purpose of two methods is classic triangulation – that is, confirmation, corroboration or convergence – a number of researchers have highlighted how important it is that methods are implemented independently (Campbell & Fiske, 1959; Caracelli & Riggan, 1994; Smith, 1997) and simultaneously (Greene et al., 1989; Morse, 2003; Smith, 1997). It is important to have two separate methods and analyses so that integration of findings only takes place at the interpretation stage (Caracelli & Greene, 1993; Sandelowski, 1995). Thus for these designs ‘integration through segregation’ of researchers may be essential. For other designs of an inductive exploratory nature, communication between researchers, and responsiveness of researchers to the ‘other’ method, may be important (Stecher & Borko, 2002). That is, ‘integration through congregation’ of researchers may be essential.

Rigour may be compromised when integrating *data*. Care may need to be taken when quantifying qualitative data and performing statistical tests on small numbers because inferences may be inappropriate when sampling is not robust statistical sampling.

Avoidance of mixed-up methods may require having the expertise within a research team, not only to undertake the separate methods, but to consider the relationship between them, and in particular to move between the two data sets when integrating at the analysis stage (Mason, 1994). Prior planning of the potential for integration, considering where it might occur, which type might be appropriate, and who will be involved in the process may help. Given that it may involve more consideration of data and findings than simply undertaking, analysing and reporting different methods separately, it seems sensible to build extra time into a study timetable for this process. However, researchers may not be able to plan everything. A strategy may emerge as the study progresses (Bryman, 1992), particularly where an iterative approach occurs as results of one data set affect the data collection or analysis of another (Greene et al., 1989).

Interpretative rigour

An assessment can be made of the inferences from the study as a whole (Tashakkori & Teddlie, 1998), for example asking whether any inferences are consistent with the data and the analysis. This is considered to be a complex issue in the field of mixed methods (Miller, 2003), with a call for standards for the evaluation of the accuracy or authenticity of conclusions (Teddlie & Tashakkori, 2003). Some researchers have suggested that a new language of 'inference quality' is needed which moves away from quantitative and qualitative language, for example 'inference transferability' for mixed methods rather than 'external validity' for quantitative methods and 'transferability' for qualitative methods (Tashakkori & Teddlie, 2003).

Success

Criteria have been devised for assessing the success of a mixed methods study (Datta, 1997). The criteria are whether the questions are adequately answered; whether they are answered within the allocated resources of time, money, and staff; whether the design trade-offs are optimised in terms of breadth and depth or some parts seem unnecessary; and whether the results are usable. A failed project is where the final comprehensive report is delayed for many years, where the cost overrun is high, where there is staff burnout, where expectations are not met, or where only some parts of the study are reported or published.

This latter issue of the publications emerging from a mixed methods study is picked up elsewhere. Brannen (1992b) notes that it is difficult to judge projects which produce separate publications from different parts of the study. Morse (2003) believes that it can be difficult to appreciate the interaction between parts of mixed methods studies because different parts are published separately. One approach to judging quality might be to consider whether the mixed methods aspect of the study is apparent during publication of the findings. One might ask whether a mixed methods study has produced something more than a series of mono-method studies. A study producing no articles, or articles from one method only might be classed as a poor quality mixed methods study. A study producing separate articles from the qualitative and quantitative methods might be classed as no better than a series of two separate studies. A study producing mixed methods articles might be considered 'successful'.

2.12.2 Existing criteria

Three groups of researchers have devised criteria for assessing the quality of mixed methods studies. They have been devised either in the context of writing a research proposal, assessing the quality of a completed study, or assessing the quality of a journal article. These are outlined below:

Proposal

In the context of helping students and novice researchers to write research proposals, Creswell offers a framework for a mixed methods proposal and a checklist of questions for designing a mixed methods procedure (Creswell, 2003). The items relevant to mixed methods research are listed in Box 2.4. Within these criteria, Creswell is concerned with communicating purpose and process, that is the clear exposition and transparency of methods; the appropriateness of choices in the light of the study questions and the design; and the validity of methods. He is interested in quality in relation to both the individual methods and the overall mixed methods strategy.

Box 2.4 Creswell's criteria for designing a mixed methods study (Creswell, 2003) p209

- Is the basic definition of mixed methods research provided?
- Does the reader have a sense of the potential use of a mixed methods strategy?
- Are criteria identified for choosing a mixed strategy (implementation sequence of data collection, priority of methods in collection and analysis, stage of integration, use of theoretical perspective)?
- Is the purpose of the study given, including both qualitative and quantitative purposes and the rationale for mixing methods?
- Is the mixed methods strategy identified and its criteria for selection given?
- Is a visual model of the design given, including correct notation?
- Are sampling strategies for both qualitative and quantitative data collection mentioned, and do they relate to the strategy?
- Are data collection procedures mentioned in relation to the strategy?
- Is data analysis mentioned in relation to the strategy? Is analysis detailed within the qualitative and the quantitative method and then between the two?
- Are procedures for validating both qualitative and quantitative data discussed?
- Is the report structure detailed? Separate chapters for methods, or intertwining of results?

Completed study

Caracelli & Riggin (1994) made a list of quality criteria for mixed methods evaluations based on brainstorming with researchers and a literature review. They then asked researchers to rate the importance of each of these criteria and used cluster analysis to group these criteria. They produced nearly one hundred items, a fifth of which related specifically to mixed methods. These items did not group together into a single domain but were concentrated in the domains of design; data quality and analysis; bias; and interpretation (Box 2.5). These researchers were concerned with minimising shared bias between methods, and the appropriateness of use of methods.

Box 2.5 Caracelli's criteria for assessing a mixed methods article

Box 2.5 Caracelli & Riggin's quality criteria relating to mixed methods evaluation

Stage	Criteria
Design	<ul style="list-style-type: none">• The use of mixed methods matched the stated purpose for combining the method types.• Strengths and weaknesses of the different method types were considered in the evaluation design.• Methods minimised shared bias.• Paradigm appropriate criteria were used to assess quality of each method.
Data quality and analysis	<ul style="list-style-type: none">• Data transformations and aggregations were defensible.• Analysis of data from different methods types was conducted systematically and appropriately.
Bias	<ul style="list-style-type: none">• Use of qualitative data to elaborate quantitative findings was appropriate.• Conceptual framework guided selection of qualitative and quantitative methods.
Interpretation	<ul style="list-style-type: none">• When combining data from different method types in analysis, weights were assigned that reflected any disparities.• The weight given to inferences drawn from different methods reflected the relevance of the measures to the construct, and the dependability of the evidence collected by the method types.• Convergent findings were not the results of shared bias between the methods.• Interpretation of data collected by different methods considered the biases (shared or divergent) of the methods.• The inclusion of data from quantitative and qualitative methods enhanced the interpretability of the findings.
Stakeholders	<ul style="list-style-type: none">• The manner of reporting findings from the method types maximises interest of stakeholders in the evaluation.• Combination of methods informed changes in policy/programme.

Journal article

Creswell also devised five criteria for assessing a mixed methods study and used them to assess studies in primary care which were reported in mixed methods journal articles (Box 2.6). These were not quality criteria but identified the important aspects of a mixed methods article. The emphasis was on transparency of individual methods and the process of mixing methods.

Box 2.6 Creswell's criteria for assessing a mixed methods article

- rationale for mixing
- methods, including analysis
- priority of the methods
- timing of methods
- stage and way in which integration occurs

Sale & Brazil undertook a literature search of critical appraisal criteria for mixed methods articles, relying on a framework of trustworthiness and rigour because of its cross-paradigm appeal (Sale & Brazil, 2004). Their intention was to generate operational criteria that a reader could apply without the need for judgement calls, rather than develop a measure of critical appraisal. They referenced the Caracelli & Riggin article discussed above but stated that they found no criteria for critically appraising mixed methods studies. The table of criteria they produced is not reproduced here because it itemises 33 criteria for assessing qualitative methods and 31 for assessing quantitative methods. The authors envisage the final product to be a reduced version of their table, combined with criteria specific to mixed methods such as identification of design and acknowledgment of paradigm assumptions.

Implications for HSR

1. Considering the meaning of quality for mixed methods research – Assessing the quality of research, including mixed methods research, is important in HSR. Although this issue has been discussed in the wider literature, further work is required which the HSR community is in a position to contribute to. Assessing whether a mixed methods study is good research (in the context of a systematic review, say), and assessing whether a study is a good mixed methods study, are both of interest to the HSR community.

Implications for this study

1. Assessing the quality of mixed methods studies in HSR - Researchers in HSR who undertake good mixed methods studies are likely to be exploiting the potential of mixed methods studies. Some quality criteria for mixed methods studies have been devised, although this aspect of mixed methods research is generally underdeveloped. It would be helpful to use the quality criteria identified from the literature to consider the quality of mixed methods studies in HSR in order to identify aspects of studies which could be improved.

2.13 THEME 11 Implementation of mixed methods studies

Organisational and implementation issues are considered to be one of the least developed aspects of mixed methods research (Teddlie & Tashakkori, 2003). There is little literature dedicated to these issues, and a request has been made for more published critiques of mixed methods studies so that other researchers can learn the lessons of practically implementing them (Datta, 1997). However, some researchers have identified problems surrounding the implementation of mixed methods studies, or constraints against mixing in the first place, and these have been posited either as potential problems with mixed methods studies or reflections on experiences of undertaking mixed methods studies.

There are indications that mixed methods studies are not always undertaken successfully. Morgan (1998) feels that if health researchers are to succeed in combining methods then they need more practical research designs (Morgan, 1998), implying some lack of success in

implementation. Datta (1997) details projects which have been successful or failed, for example projects where the final comprehensive report was delayed for many years (Datta, 1997). Of course implementing any research design is challenging and it is important to try to distinguish difficulties specific to mixed methods studies. The following issues have been discussed in the literature as challenges to the implementation of mixed methods studies:

2.13.1 Costs

A barrier to undertaking mixed methods studies may be that they are costly (Brannen, 1992b; Fry et al., 1981; Ong, 1993; Shih, 1997; Waysman & Savaya, 1997), or their individual components are costly (Parry-Langdon et al., 2003). Therefore the quality of design and expected outcome has to be weighed against the direct costs of the research (Coyle & Williams, 2000; Waysman & Savaya, 1997). For example, interviews and/or focus groups can be used to generate items for a survey instrument but this may be expensive in terms of time and money and it is important to determine whether it is worth it (Wackerbarth et al., 2002).

Also, the way in which costs accumulate over different types of research is different, with design and implementation costly in quantitative research, and data collection and analysis costly in qualitative research (Brewer & Hunter, 1989). This may be a challenge to manage in the context of a single study.

2.13.2 Funding and funding bodies

In the 1990s, funding was seen as a practical constraint on combining methods because social policy funding bodies had a preference for quantitative research (Brannen, 1992b) or funding bodies preferred projects that were either quantitative or qualitative (McDowell & MacLean, 1998). Yet a conflicting view emerged only a little later in the context of health policy research, when concern was expressed that funding bodies' desire for mixed methods studies might lead to inappropriate use of this approach (Barbour 1999).

The influence of funding bodies has also been discussed in the context of publications emerging from mixed methods studies. Separate publication of different components of mixed methods studies may be due to the pressure to publish from both funders and the research community, and it may be difficult to resist this pressure and wait for completion of the whole study prior to publication (Mason, 1994).

2.13.3 Researchers: expertise and teams

Brannen (1992b) discusses the different combinations of researchers undertaking mixed methods studies. For example, if quantitative research is a small part of a qualitative study then qualitative researchers tend to undertake it, but when a project is mainly quantitative, qualitative skills may be imported from outside the team because quantitative researchers rarely have qualitative skills (Brannen, 1992b). If both methods are used simultaneously, use may be made of a multi-talented researcher or separate teams (Brannen, 1992b).

A barrier to undertaking mixed methods studies may be difficulty finding researchers with expertise in data collection and analysis of both methodologies (Shih, 1997). It is rare for an individual to be proficient in both qualitative and quantitative research due to problems gaining training, particularly in the context of short-term contracts, but also because people may have natural dispositions for one method rather than another (Brannen, 1992a). Further, disciplines are associated with paradigms, offering another constraint on an individual training outside their discipline (Brannen, 1992b). However, it may not be necessary to have an individual equipped to undertake both methodologies because researchers tend to work in multidisciplinary teams (Poole et al., 1999). In fact having more than one researcher involved may offer a more comprehensive perspective on the study (Rossman & Wilson, 1994).

Challenges can be faced within a team of researchers working on a mixed methods study. Members of a team will need to have clear expectations of what is expected from each person on the team (Morgan, 1998). Unless there is a minimum competency in both methodologies among team members, they will not be able to communicate and integration may be difficult. Researchers have proposed the need for 'methodological bilingualism' to aid communication (Teddlie & Tashakkori, 2003). For example, the term 'observational study' means different things to qualitative and quantitative researchers; and negative cases are used to explicate findings in qualitative research and to disprove them in quantitative research (Barbour 1999). Taking teamwork seriously, and taking a collaborative approach to a mixed methods study, may lead to learning that goes beyond the additive learning from the separate components (Shulha & Wilson, 2003).

A team may need someone who is not necessarily expert in both methodologies, but is expert in combining methods, an issue proposed as long ago as 1944 in the context of qualitative interviewing and surveys (Morgan, 1998). This person would need an understanding of the rationales for combining both forms of data so that they can be articulated in a proposal and project (Creswell, 2003).

Hierarchical structures may place constraints on combining methods, particularly where one type of researcher has a subordinate role (Brannen, 1992b). If a researcher is needed for the

early stages of a project only, then they may have left the project before the analysis and report have been completed (Datta, 1997). The roles of researchers, and the skills needed within a team, may develop throughout a mixed methods study. Researchers may face the challenge of adopting a continuum of roles as they experiment with different methods, for example quantitative researchers practicing reflexivity as well as qualitative researchers (Coyle & Williams, 2000).

2.13.4 Training

There are few courses in mixed methods research, so researchers are essentially self taught (Teddlie & Tashakkori, 2003). Teaching about mixed methods research, and collaborating on projects, is thus important for the development of expertise (Teddlie & Tashakkori, 2003).

2.13.5 Time

One researcher found that rather than paradigms being an issue in their mixed methods study, the challenges were more around time and practicalities (Laurie, 1992). Mixed methods studies require more time and effort than single method approaches (Teddlie & Tashakkori, 2003). This is because there are more methods but also because time is needed to synthesise data and follow up any divergent findings, sometimes with further study after initial data collection and analysis (Waysman & Savaya, 1997). Engaging with integration is time consuming and funders do not necessarily offer the flexibility needed in time lines to facilitate full use of methods in US health research (Forthofer, 2003). This may lead to neglect of integration and a lack of consideration of discrepancies between methods.

Additionally, the time taken for each method may be different and the two may not work together in practice as they were designed to work in theory. For example, a survey instrument took 45 minutes to complete during a structured interview. A qualitative researcher was asked to design a new module for the instrument which could only take five minutes to complete. Qualitative interviews and focus groups threw up a number of complexities which helped to design the module. However, the lack of time available for the module within the survey instrument severely limited the important issues which could be explored in any detail (Laurie, 1992).

2.13.6 Motivation for doing mixed methods

The motivation for undertaking a mixed methods study may be that it is the most appropriate way of addressing a set of questions. However, other motivations can occur which are unrelated to the potential methodological benefits of mixed methods research. Barbour (1999) has expressed concern that the desire of funding bodies, or the diverse interests of the research team, can lead to the use of mixed methods research rather than the research questions themselves.

2.13.7 Status of each method

The status of each method may impact on implementation. If the role of qualitative research is to develop an instrument, then the qualitative component of the study may not be considered to have a status in its own right (Brannen, 1992b). This may not be satisfactory for a qualitative researcher. Conversely, if qualitative and quantitative research are equal partners, then it may not be easy to combine methods in practice (Morgan, 1998).

2.13.8 The unwanted and unintended

Qualitative research can identify problems with the implementation of the service under evaluation, or the evaluation itself, by identifying the viability of the quantitative evaluation (Bate & Robert, 2002; Riley et al., 2005). This can make it threatening to the researched and researchers alike.

Further, qualitative research may influence participants to take action by helping them to identify deficiencies and then address them, and in doing so affect the intervention under study (Bate & Robert, 2002). This can lead to a range of decisions being faced such as whether cases are sampled for the qualitative component from the cases within the quantitative study or outside the quantitative study to stop contamination (Rousseau et al., 1999).

Additionally, mixed methods studies may be undertaken with the intention of completeness but may unintentionally show confirmation. Further, the complex nature of mixed methods research may modify the aims and objectives as the research proceeds (Coyle & Williams 2000).

2.13.9 Ignoring paradigms

Simply ignoring paradigmatic differences may cause difficulties in practice (Coyle & Williams, 2000). Researchers hold mental models of 'good research' and 'good evaluation' and may judge other types of research by their own standards, for example quantitative researchers may want inter-rater reliability tested in qualitative research (Smith, 1997) or criticise process evaluations as poor quality (Parry-Langdon et al., 2003). This may lead to misunderstandings between researchers, and inappropriate use of methods such as taking a quantitative approach to qualitative data analysis (Sale et al., 2002). Therefore it may be important for researchers to articulate their paradigms because two researchers working from different paradigms might use the same methods but analytically treat their results differently. Indeed, two researchers working in different paradigms may not be able to bring together their findings (Sandelowski, 2000).

Finally, one should not assume that all qualitative researchers share the same paradigm because there are different epistemological stances within qualitative research and different assumptions about what constitutes data (Barbour, 1998).

2.13.10 Operating in different worlds

Qualitative and quantitative researchers make use of different journals and different sources of funding, as well as different expertise and different methods (Sale et al., 2002). They may have different beliefs about the centrality of design within a study (Rousseau et al., 1999). Thus their priorities may be different and tensions may arise within teams. Additionally, promotion committees may not be able to engage with mixed methods research and may judge researchers in their own narrow methodological approach (Currall & Towler, 2003).

There may be scepticism of any theory or method associated with a different methodological approach. It has been suggested that respect and collegiality is needed in mixed methods research so that researchers feel able to expose their thinking and share with colleagues (Rossman & Wilson, 1994). This may be difficult where divergent findings occur, which may lead people into entrenched positions, guarding their methods and findings (Waysman & Savaya, 1997).

2.13.11 Presentation of mixed methods studies

Reporting has been noted as a challenge in mixed methods studies in HSR (Johnstone, 2004) as well as in other research fields. Qualitative and quantitative readers bring different experiences, language, and expectations to reports, making it a challenge to meet the needs of readers when presenting a mixed methods study (Sandelowski, 2003). The write-up must be accessible and appealing to mixed audiences, and respectful of diverse communities by not depicting one method as inferior or apologising for a 'lack' in one method.

Deciding how to present a study can cause difficulties: quantitative research is linear and standardised and novelty breeds suspicion; in qualitative research the analysis and data collection can be iterative and the language expressive, with no separation of findings and interpretation. A separate sequential format can display the methods and findings of one component which is then followed by the other component, or a format can be used that weaves both together. It has been suggested that analyses need to be written up in an integrated way showing the journey between data sets rather than writing up methods and results of one and then the other (Bazeley, 2003). Mixed methods writers have to decide how best to show the temporal analytical and interpretative relationships between qualitative and quantitative entities in their studies.

Choosing how to present all components of a study, and their interactions, in a report may be difficult, but publication in peer-reviewed journals may cause further difficulty. Journals may not accept such papers (Brewer & Hunter, 1989; Currall & Towler, 2003; Wong, 2002) or may require that researchers de-emphasise one method, leading to a call for a mixed methods journal (Brewer & Hunter, 1989). Similarly to reports, presentation of methods and findings in articles may be challenging.

2.13.12 Gender

The gender of researchers has not been put forward explicitly as a challenge to the implementation of mixed methods studies. However, there is some reference to the alignment of quantitative methods with male values of distance and qualitative methods with female values of closeness (McDowell & MacLean, 1998). Qualitative research can be viewed as associated with feminist research (Deem, 2002). Indeed Oakley has tackled this in the context of social science, attempting to separate methodology and gender (Oakley, 2000). Nonetheless associations between gender and methodology may present challenges within mixed methods studies.

2.13.13 Too much data

Mixed methods studies may produce overwhelming amounts of data which may never all be fully analysed (Parry-Langdon et al., 2003).

Implications for HSR

1. Understanding the challenges of implementing mixed methods studies - There is evidence of practical difficulties with implementing mixed methods studies within HSR and other fields. The HSR community is contributing to this body of knowledge in the context of qualitative research and randomised controlled trials.

Implications for this study

1. Exploring facilitators and barriers to exploiting the potential of mixed methods studies in HSR - The literature highlighted a number of challenges around implementing this approach in practice. These may be similar within HSR, or HSR may have its own unique challenges. Interviews with researchers undertaking mixed methods studies in HSR would help to explore the facilitators and barriers to fully exploiting the potential of mixed methods studies.

2.14 Summary

Three sets of conclusions may be drawn from the literature – conclusions about mixed methods research, lessons about mixed methods research for the HSR community, and implications for the empirical study.

2.14.1 Mixed methods research

- The depth and breadth of literature on mixed methods research from the UK and North America over the past twenty years is impressive. Researchers have described a wide variety of roles of methods, purposes of mixing, and ways of integrating data and findings.
- Paradigms are the most discussed aspect of mixed methods research with researchers tending to find a philosophical space, such as pragmatism, to work within when undertaking mixed methods studies.
- Although there are a variety of ways of integrating data and findings in mixed methods studies, there appears to be a lack of integration occurring in studies in practice.
- There are lots of types of mixed methods studies, and typologies which attempt to summarise them, but no typology is considered to be superior.
- There is a need to give further consideration to developing quality criteria for mixed methods studies.
- There are many challenges to implementing mixed methods studies, and this aspect of mixed methods research requires further consideration.

2.14.2 Lessons for HSR

- There is a considerable body of research outside HSR about mixed methods research. Researchers in HSR are beginning to reflect on this literature and communicate the key issues about mixed methods research to an HSR audience (Adamson, 2005; Barbour, 1999; Johnstone, 2004; McDowell & MacLean, 1998).

- The HSR community is beginning to add to the body of knowledge about using mixed methods research in the context of evaluations. In recent years researchers in HSR have written papers about the processes and challenges of undertaking process evaluations alongside randomised controlled trials (Parry-Langdon et al., 2003; Riley et al., 2005; Rousseau et al., 1999), and the innovative use of qualitative methods to improve trial methodology (Donovan et al., 2002).
- There is further work to be done on communicating key issues about mixed methods research to the HSR community, in particular those identified at the end of each theme in this chapter. Articles in key HSR journals, and chapters in key text books used in HSR teaching, are needed. This is happening (Adamson, 2005; Barbour, 1999), but further sources of education are necessary. This chapter has been used as a basis for a chapter in a key text book in HSR (O'Cathain & Thomas, 2006) and for presentations to a range of researchers within and outside HSR (see Appendix A), to facilitate further education in mixed methods research in HSR.

2.14.3 Implications for the empirical study

- The literature review has helped to clarify the definition of a mixed methods study for the empirical study, and shape the design and content of the empirical study by identifying a range of ways of exploiting the potential of mixed methods studies, and by identifying possible facilitators and barriers to exploiting the potential of mixed methods studies.
- The definition of a mixed methods study for the empirical part of this study is that there is

a qualitative component where data collection is open and non-standardised and the analysis is textual

AND

a quantitative component where data collection is pre-determined and standardised and the analysis is statistical

WHERE

both components are based on primary research and are undertaken within a single study.

- There is little explicit guidance on how to exploit the potential of mixed methods research. However, there is a great deal of variety in the justifications for using a mixed methods approach, how paradigms are dealt with, the roles of methods, the combinations of methods, and the processes of using methods within mixed methods studies. To exploit the potential of mixed methods studies, the HSR community may need to draw on this variety. There is a need to describe the characteristics of mixed methods studies in HSR to identify any gaps in the way in which methods are combined, and indeed any unique contributions the community might be making to the general field of mixed methods research (see Chapter 4).
- Mixed methods studies may be of variable quality. To exploit the potential of mixed methods research, the HSR community may need to improve the quality of mixed methods studies undertaken. There is a need to study the quality of mixed methods studies in HSR to identify good practice and areas for improvement. There is no objective gold standard of good practice in mixed methods studies and quality criteria will need to be devised for application to mixed methods studies in HSR (see Chapter 5).
- There are challenges to implementing mixed methods studies in practice. They may be context dependent, differing between research communities and time periods. Exploring the facilitators and barriers to implementing mixed methods studies in HSR may help to understand how to exploit the full potential of this approach. The literature review has helped to identify potential facilitators and barriers to explore within interviews with researchers in HSR, including their justifications for undertaking mixed methods studies, how paradigms affected their studies, and the expertise available to them (see Chapter 6).

Chapter 3 Methods for empirical study of mixed methods research in HSR

3.1 Objectives

The objectives of the empirical study were described in Chapter 1 - to explore whether researchers in HSR are exploiting the potential of mixed methods studies, and the facilitators and barriers to doing so. The literature review did not affect the objectives of the empirical study but rather informed how they might be addressed (see Section 2.14.3 in Chapter 2). The objectives of the empirical study, informed by the literature review, were:

- To identify whether mixed methods studies undertaken in HSR fully exploit the potential of mixed methods research by drawing on the range of roles of methods, types of mixing, and approaches to integration identified in the literature review.
- To identify whether mixed methods studies in HSR fully exploit the potential of mixed methods research by being of high quality.
- To identify the facilitators and barriers to researchers in HSR exploiting the potential of mixed methods studies.

3.2 A mixed methods design

The overall research question about how to exploit the potential of mixed methods studies in HSR required multiple methods because the broad question contained two narrower questions. It was clear from the literature review that the HSR community can exploit the potential of mixed methods research by drawing on the variety of characteristics of mixed methods studies

and undertaking studies to a high quality. However, it was also clear that researchers may encounter facilitators and barriers to undertaking these studies in practice, which may help or hinder them to exploit this approach. The methods were chosen to best address the different aspects of the overall research question.

Documentary analysis was selected as a useful approach to studying the characteristics and quality of mixed methods studies in HSR. Documents such as peer-reviewed articles, final reports, and proposals are the public face of research studies. They detail which methods are used within studies, and can be used to determine the quality of studies. One approach to documentary analysis is to make an interpretative or critical analysis of documents (Murphy et al., 1998), considering them as a means of maintaining power relations, and using them *indirectly* as 'accounts' which reveal issues about researchers and the context in which they operate. However, given that the objective of this component of the study was to describe the types of mixing and the quality of studies, it was considered to be more appropriate to use documents from mixed methods studies *directly* as potentially accurate records of researchers' intentions and experiences. A quantitative content analysis approach to documentary analysis was chosen to study characteristics and quality in order to identify both gaps in the way in which mixed methods research is used in HSR, and the frequency with which they occur. A documentary analysis was undertaken with attention paid to objective and systematic procedures, following good practice in quantitative documentary analysis (Hodson, 1999). This included being explicit about the type of documents included; determining a search strategy for those documents; developing explicit criteria for inclusion and exclusion of documents; considering sample size and an appropriate sampling strategy; constructing a Coding Sheet; writing a Coding Protocol to ensure consistent coding; field testing the Coding Sheet; revisiting and reviewing the Coding Protocol regularly; periodically reviewing the Coding Protocol while reading documents to ensure memory of issues being looked for; and paying attention to generalisability.

The second aspect of the research question was about what helps and hinders researchers to exploit the potential of mixed methods studies. In Chapter 2, some of the challenges of undertaking mixed methods research were explored. However, these may not be relevant within HSR or there may be challenges specific to HSR. Researchers who have undertaken mixed methods studies in HSR will hold perceptions of how researchers can exploit the potential of mixed methods studies. One approach to identifying these perceptions is a predominantly quantitative approach, undertaking a small number of qualitative interviews to aid the design of a questionnaire for a survey of researchers. This survey would then be used to describe the prevalence of any barriers and facilitators to exploiting the potential of mixed methods studies in practice. However, some of the barriers and facilitators may not be obvious to researchers themselves, and they may be context dependent (Bryman, 1988). A quantitative approach may

be premature before those perceptions and experiences are understood in depth. Qualitative methodology offers a flexible approach which could uncover areas not anticipated at the beginning of the research, and which could access the range and depth of people's opinions more than a survey approach (Pill, 1995). Both focus groups and interviews would be an appropriate way of gaining researchers' views. Given that views might depend on specific experiences, interviews were considered to be a more appropriate method, allowing connections to be made directly between individual views and experiences. Interviews can be unstructured or semi-structured and can vary in depth (Britten, 2000). Given that there was an agenda in this study to understand how researchers do and do not exploit the potential of mixed methods studies, and some *a priori* issues identified from the literature in Chapter 2, semi-structured interviews were selected as the most appropriate approach. Quality issues identified for qualitative research were considered within this component of the study including transparency of method, investigation of negative cases, and reflexivity (Murphy et al., 1998).

To summarise, the design of the empirical study was mixed methods with two distinct components - a quantitative documentary analysis and a qualitative interview study. The purpose of using this mixed methods approach was complementarity, that is, that each component would address a different aspect of the question 'how to exploit the potential of mixed methods studies in HSR'. Each component had equal status within the study and each had 'standalone' status rather than acting merely in a supplementary role to a dominant component. The detailed methods of each component are discussed below, followed by further description of the relationship between the components throughout the study.

3.3 Documentary analysis of mixed methods studies in HSR

A variety of ways of mixing methods was identified in the literature review (see Chapter 2). Researchers in HSR could exploit the potential of mixed methods studies if they drew on the range of ways of mixing methods that are appropriate to HSR and undertook good quality mixed methods studies. The aim of this component of the study was to describe the characteristics and quality of mixed methods studies in HSR to identify how they are undertaken and how they might be improved.

Other researchers who have undertaken empirical study of how mixed methods approaches are used have searched electronic databases of peer-reviewed journal articles and studied how methods have been mixed within these articles (Bryman, 2006a; Creswell et al., 2004). In a pilot for this thesis, undertaken as part of an MA in Research Methods in Sociology, a search of electronic databases for mixed methods studies revealed that these studies do not necessarily

result in mixed methods peer-reviewed publications (O'Cathain, 2003). Given that the focus of this study is mixed methods *studies* rather than mixed methods articles, an alternative way of accessing studies was required. Two approaches to identifying studies were considered. The first was a qualitative approach of purposive sampling which has been used by other researchers undertaking a similar study of mixed method evaluations (Greene et al., 1989). This would have involved identifying different types of mixed methods studies from a range of sources including publications, funding bodies, and personal knowledge. However, the frequency of use of particular ways of mixing methods was important to the study question and therefore a quantitative sampling strategy was considered to be more appropriate. This required the identification of a finite population of HSR studies and then the identification of mixed methods studies within that population.

3.3.1 Identifying HSR studies

Potential sources of HSR studies include:

- the National Research Register, a database of ongoing and completed research projects funded by, or of interest to, the NHS, containing details of over 100,000 studies;
- ReFeR, the register of research findings of completed studies funded by the Department of Health;
- electronic databases of studies commissioned by funders of HSR including the Medical Research Council, disease specific charities such as the National Asthma Campaign, and the Department of Health.

The National Research Register and ReFeR were considered to be problematic sources of mixed methods studies in HSR for three reasons. First, they are incomplete registers of research and there may be some systematic bias in the types of studies registered. Second, they both have limited search facilities for the identification of mixed methods studies within the large number of registered studies. Even research databases with sophisticated search facilities are problematic for searching for methods because methods are rarely used as key terms. The authors of a study of programme evaluations in the field of health care preferred to hand-search a selection of journals rather than search electronic databases because of this problem (Murphy et al., 1998). Third, they include types of health research other than HSR. Thus all studies on the database would have to be assessed to determine whether they were HSR prior to inclusion in the population of relevant studies for this study. HSR is defined as research focusing on the description and evaluation of *health services and health care*, in contrast to epidemiology for example which is the study of *disease* in a human population. However, the boundaries between HSR and other types of health research are not clear. For example, the development and testing of an instrument to measure health may not strictly be classified as HSR but is nonetheless

important to the description and evaluation of services. Given the challenge of distinguishing HSR from other types of health research, an alternative approach was to identify a commissioner of research with a focus on health services rather than diseases, and accept all health studies funded by them as HSR.

A key commissioner of HSR is the Department of Health, which invests in research to support government objectives for public health, health services, and social care (www.dh.gov.uk/policyandguidance/researchanddevelopment 12/8/04). This funding body is an excellent source of HSR studies, with the limitation of focusing the study on England rather than the United Kingdom or countries worldwide. Research is directly commissioned through the Policy Research Programme and the National R&D programme using a variety of funding initiatives including: funding of research units; capacity building in the form of studentships and fellowships; and funding of projects through a range of schemes and programmes including charities commissioning research on the Department's behalf. For this study, the population of HSR studies was defined as single research projects, rather than programmes, researchers and research units, which were funded by the Department of Health Research & Development Programme. Past and current commissioned studies are listed on their website under the following programmes:

- The national NHS R&D current programmes
 - Service Delivery and Organisation programme (SDO)
 - Health Technology and Assessment programme (HTA)
 - New and Emerging Applications of Technology programme (NEAT)

- The national NHS R&D past programmes
 - Mother and child health
 - Primary and secondary care interface
 - Cardiovascular disease and stroke
 - Forensic mental health
 - Physical and complex disabilities
 - Primary dental care
 - Promoting implementation of research findings

- The Policy Research Programme (PRP).

It was important that a complete list of projects funded by each programme was easily accessible. Electronic lists of funded studies were available for each programme except the Physical and Complex Disabilities programme and therefore this programme was excluded. Further, in one section of the Department of Health website, reference is made to Asthma and

Cancer programmes. These programmes are funded from a variety of sources and administered by the charities 'the National Asthma Campaign' and 'the National Cancer Research Institute'. The Department of Health website directs readers to the websites of these charities, which have databases of studies funded from a variety of sources and focusing on disease etiology as well as health services. The concerns expressed about NRR and ReFeR were relevant to these programmes because of the need to apply a definition of HSR and the need to identify studies using search terms. Thus the Asthma and Cancer programmes were excluded.

Given that the focus of this thesis was mixed methods research in the context of primary research undertaken in single studies of health, only the relevant parts of some programmes were included. Primary research projects and systematic reviews are listed separately on the HTA database, so only the primary research studies were included. Systematic reviews are listed separately for the Forensic Mental Health programme and this part of the programme was excluded. The focus of the study was on single projects and therefore the 'units' and 'initiatives' databases of the Policy Research Programme were excluded. The focus of the study was health and therefore projects listed under social care on the Policy Research Programme were excluded. The Policy Research Programme only included studies commissioned up to and including 2001. In all, ten programmes were included in the study (Box 3.1).

Box 3.1 Department of Health Research & Development programmes included in the population of HSR studies

1. Service Delivery and Organisation programme (SDO)
2. Health Technology and Assessment programme (HTA), primary research only
3. New and Emerging Applications of Technology programme (NEAT)
4. NHS R&D Mother and child health
5. NHS R&D Primary and secondary care interface
6. NHS R&D Cardiovascular disease and stroke
7. NHS R&D Forensic mental health, excluding systematic reviews
8. NHS R&D Primary dental care
9. NHS R&D Promoting implementation of research findings
10. NHS R&D Policy Research Programme (PRP), single projects only, health only

3.3.2 Identifying mixed methods studies in HSR

Summaries of either the research proposal or the report for studies commissioned by each programme were listed on the Department of Health website. Titles only, rather than summaries, were available on the website for a small proportion of studies and in these cases the study was searched for on the National Research Register and ReFer databases to locate a summary. If a summary could not be located, the study was excluded from the analysis. In August 2004 the summaries for each project were read by one researcher (AOC), first to ensure that projects met the inclusion criterion of being primary health research, and then to categorise them as a mixed methods study or not. Studies were excluded if they involved literature reviews only; were undertaken in laboratories on animals, drugs or machines; or were not research projects e.g. funding for dissemination strategies, programmes, or staff.

The definition of a mixed methods study given in Section 2.14.3 in Chapter 2 was used to determine whether a study was mixed methods or not. The definition was 'a qualitative component where data collection is open and non-standardised and the analysis is textual AND a quantitative component where data collection is pre-determined and standardised and the analysis is statistical WHERE both components are based on primary research and are undertaken within a single study'. However, this definition was difficult to apply in practice to summaries of research studies because the detail available in summaries about the different components rarely covered both data collection and analysis. Researchers tended to describe either methods of data collection or research design, for example randomised controlled trials, surveys, or focus groups. Therefore, at this stage, studies were classified as mixed methods if they had both qualitative and quantitative components, where the qualitative component was any of the approaches included in two key texts on qualitative research in HSR (Murphy et al., 1998; Pope & Mays, 2000), and the quantitative component was any of the approaches included in two key texts on HSR (Bowling, 1997; Jenkinson, 1997). (See Box 3.2).

The two lists in Box 3.2 were applied to the summary of the research proposal or report listed on the Department of Health database. If a study used an approach from the first list and an approach from the second list then it was classified as a mixed methods study. Descriptions of methods were not specific in some studies, for example, 'gaining the perceptions of users' might mean that a survey or in-depth interviews had been undertaken. Projects were assumed not to have a qualitative component unless researchers explicitly used the term 'qualitative' or terms associated with qualitative research such as 'in-depth interviews'. Approaches indicated by '+' in Box 3.2 required further rules of application. These approaches are generally described as 'qualitative research' but they might have both qualitative and quantitative components. Use of

the generic term was considered to be a qualitative component only. However, if the researcher described the use of quantitative and qualitative components within one of these approaches, in particular case studies, then the study was classified as mixed methods. Further, some of the approaches indicated by '+' in Box 3.2 might use either unstructured data collection with textual analysis or structured data collection with statistical analysis e.g. consensus methods and documentary analysis (Bowling, 1997). If details were not given about data collection and analysis then these approaches were classified as qualitative components.

Box 3.2 Approaches classified as qualitative or quantitative

Qualitative approaches	Quantitative approaches
Observation	Cross sectional survey
Interviews	Other observational study
Focus groups	Randomised controlled trial
Conversation analysis	Other intervention study
Consensus methods+	Economic component
Case studies+	
Documents +	
Action+	

+may have qualitative and quantitative components

3.3.3 Locating documentation about mixed methods studies

Once identified, relevant documentation about each study was located. This included the final report, proposal, and any emerging publications. The final reports of mixed methods studies were considered to be key documentation because they detail the study from design to interpretation. However, these are only available for completed studies and a focus on final reports was considered to limit the relevance of the findings to older studies, leaving a question mark about current practice. Research proposals are available for completed and ongoing studies and also document intentions about the way in which mixed methods are to be used. Including both research proposals and reports in the documentary analysis ensured that both completed and ongoing studies were included in this study. Rather than use the report as the key document for completed studies, and the proposal as the key document for ongoing studies, the proposal was used as a document of intent and the final report as a document of practice.

Obtaining both proposals and reports, if they were available, offered a more comprehensive view of mixed methods studies. It also allowed identification of any changes occurring between the design stage and the end of a study which might indicate the difficulty of undertaking some types of mixed methods studies, or their inappropriateness in some situations. Finally, given that some studies produce mixed methods papers and others do not, publications were also located to allow for an assessment of the types of publications emerging from mixed methods studies.

Once a study was identified as a mixed methods study, a request was made to the named lead researcher for all documentation relating to the study, that is, the full research proposal, the final report, and a list of any publications emerging from the study. This request could have been made to the Department of Health. However, at the time (late 2004) the Department of Health was dealing with an extensive internal reorganisation. Instead, up-to-date names and workplace addresses of the named lead researchers were identified using the search engine 'Google' on the world wide web, and letters posted to them. The process of requesting documentation was piloted (see Appendix B). The request for documentation was made in September 2004 (see Appendix C for letter of request). In October 2004, approximately one month later, an email reminder was sent to non-respondents.

3.3.4 Designing the data extraction form

A Coding Sheet was designed to extract data from the documentation of each mixed methods study (Appendix C). It was designed to extract data about the context of the study, the characteristics of the study, and aspects related to the quality of the study.

Context of studies

Background information about each study was extracted for context. This included: title, topic, sector in which study was undertaken, type of participant, number of applicants/authors, number of places from which the applicants/authors were drawn, discipline of lead applicant/author, source of funding, start date, length of project, cost, sector in which the research was based, and the types of research participants. In addition, a short summary was made of the methods used to collect data, as an aid to further data extraction.

Characteristics of studies

Important characteristics of mixed methods studies were identified in the literature review in Chapter 2 including the roles of methods used, the purpose of mixing methods, the timing of methods, the priority of methods, the stage of study at which mixing occurred, and the type of integration. These characteristics were included on the Coding Sheet.

Nine typologies of mixed methods studies were described in Chapter 2, where it was clear that there is no consensus on which is best (Creswell et al., 2003). Some of the typologies did not have face validity for the definition of mixed methods used in this study. Both Patton's typology in 1990, and Tashakkori & Teddlie's in 1998, include intra-method mixing which is not the focus of this study. A further four of the typologies do not address integration, a key aspect of mixed methods studies identified in Chapter 2. Three typologies address the key characteristic of integration and apply a definition of mixed methods relevant to this study (Rossman & Wilson 1994, Caracelli & Greene 1997, and Creswell 2003). Therefore the Coding Sheet included these three typologies and a three point scale of the reviewer's perception of the ease with which each typology could be applied to a study. Open comments about any difficulty applying a typology could be written on the Coding Sheet.

The quality of mixed methods studies in HSR

A considerable amount of thought was given to how to assess the quality of the mixed methods studies. This was informed by the literature review in Chapter 2 and further reading of literature on quality assessment of research in general. One approach considered was to use critical appraisal tools developed both for specific research designs and for generic use across all designs (Katrak et al., 2004). However, design-specific tools contain items that address methodological issues unique to the research design and thus will only be relevant to components of mixed methods studies. Generic tools have been found to be too generalist in the nature of their items and to have variable applicability across research designs (Katrak et al., 2004). They are also unlikely to focus on aspects of quality specific to mixed methods research. A second approach considered was to develop a critical appraisal tool for mixed methods studies based on existing criteria for assessing the quality of mixed methods studies (Caracelli & Riggan, 1994; Creswell et al., 2004). This would have been a considerable undertaking, and was not an objective of the study. Given the early stage of development of mixed methods in HSR, and the objective of this part of the study, the approach taken here was to identify a list of questions about a study which might illuminate different aspects of quality. This approach has been taken

by researchers considering quality in the context of reviewing the synthesis of qualitative and quantitative evidence, (Mays et al., 2005).

In Chapter 2, important aspects of quality were identified for mixed methods studies and these included the individual methods, the mixing of methods, the integration between methods, the interpretative rigour, and the success of the study. These aspects were used to shape the set of questions used on the Coding Sheet.

Assessing the individual methods

Checklists and schemes exist for specific methods and methodological approaches, including: a checklist which encompasses randomised and non-randomised studies of health care interventions (Downs & Black, 1998); a checklist for questionnaire studies (Boynton & Greenhalgh, 2004); and schemes for assessing the quality of qualitative research (Pope and Mays 2000, Blaxter on behalf of BSA Medical Sociology Group 1996, and Popay 1998 in Mays et al., 2001; Spencer et al., 2003). One option was to apply a relevant checklist to the quantitative method in a study and then apply one of the schemes to the qualitative method. This was not feasible because it is not unusual to have more than one qualitative method and more than one quantitative method within a mixed methods study in HSR (see Chapter 4), and this would have resulted in an extremely long and time consuming Coding Sheet. Therefore one set of questions was devised for the quantitative *component* which reflected aspects of quality important to quantitative research, and another set was devised for the qualitative *component* which reflected aspects of quality important to qualitative research.

Assessing mixing and integration

Existing quality criteria for mixed methods studies were a useful source of questions for assessing mixing and integration (Caracelli & Riggin, 1994; Creswell et al., 2004).

Assessing success or 'yield'

A mixed methods study could be assessed as successful in this study if the potential of using mixed methods was fully exploited. Additionally, concerns have been expressed about the tendency to break studies into pieces and publish the qualitative and quantitative components separately (see Chapter 2), suggesting that an assessment of the types of publications emerging

from a study was needed. In effect, this assessment of the potential and product of a study was an assessment of the 'yield' from a study.

Devising questions about quality

Questions about quality were devised from existing criteria for assessing the quality of mixed methods studies (see Section 2.12), criteria implicit within the literature review in Chapter 2, and checklists and schemes outside mixed methods research. To identify any further issues specific to HSR, four mixed methods studies in the documentary analysis were selected based on having different types of documentation available and taking different approaches to mixing methods. Available documentation for each study was read and quality issues identified (see Box 3.3). Many of the quality issues identified had already been covered in the literature, but a few new issues emerged. Aspects of quality covered included: *transparency* - that the aims, methods, data collection, analysis and reporting of methods and conclusions are clear; *appropriateness* - of methods used, analysis and links between data and conclusions; *validity* - bias, confounding and generalisability for quantitative research, and attention to context and reflexivity for qualitative research; *expertise* - having the right expertise on the research team; *sophistication* of analysis; and the *feasibility* of any planned design. Each question was given the tick box option of 'yes', 'no', 'not enough information' and 'not applicable'. Space for open comments was available alongside each question in order to detail good practice and any concerns. These free text comments were a key part of the data collection, being the source of detail about what worked well, what was missing, and how it could be improved upon.

A question was devised to make a subjective assessment of 'yield' for each study, based on whether researchers had exploited the potential of mixing methods. Space for open comments was allocated to describe which aspects of the proposals or reports had not been fully exploited and to note examples of good practice which are easily accessible to the wider HSR community. A more objective assessment of yield was also made based on types of publications emerging from each study. A typology of the yield of publications was devised to determine whether a mixed methods study yielded no publications, only publications based on the qualitative component, only publications based on the quantitative component, separate publications from both components, or mixed methods publications. Publications were considered to be empirical papers in peer-reviewed journals. HTA reports were included as publications, as well as reports, because they are considered to be formal peer-reviewed publications, and available electronically through a central resource. The following exclusions were made: book chapters because they may not be peer-reviewed and are not easily accessible through electronic databases; letters due to their brevity; conference presentations due to their lack of accessibility;

Box 3.3 Issues emerging from consideration of the quality of four HSR mixed methods studies

Research proposals (n=3)

- Did applicants give details about both the qualitative and quantitative analyses?
- Did applicants state explicitly the purpose of each method and the purpose of the mixing?
- Were applicants clear about the process in terms of the sequence and priority of different methods, rather than leaving the timing of methods to the imagination of the reader?
- Were applicants clear about what integration would be undertaken, for example whether the results of one method would affect the analysis of the other, or whether results obtained for both would be considered together at the analysis or interpretation stage?
- Did each method have sampling and analysis appropriate for their purpose? For example, if a sampling strategy has been borrowed from another methodological approach, such as the use of random sampling in a qualitative method, that this is appropriate for addressing the qualitative question.
- Were analyses of individual methods appropriate? For example, the use of grounded theory in a qualitative study with an explicit agenda might be inappropriate.

Reports (n=2)

- Did the sequencing of methods fully exploit the strengths of both methods and make the most of mixing methods? Concurrent use of methods did not seem to do this, for example qualitative interviews revealed outcomes important to patients; these might have been addressed in the RCT if the interviews had been undertaken before rather than alongside the RCT.
- Were samples and respondents described in detail?
- Was the timing of methods clearly stated in the methods, rather than lost in one sentence statement in the results?
- Were analyses described in detail? For example, in one study the results from open questions on surveys were discussed but no details were given about how these open questions were coded and analysed, and what status they were given in terms of being treated qualitatively or quantitatively.
- It is helpful when results are interwoven around specific issues in the results section, because the reader can see where the quantitative finding gives context to the qualitative finding, or where the qualitative finding shows some added complexities around the quantitative finding. However, is it clear which result comes from which method?
- Is there balance in the way in which results from different methods are considered in the discussion and conclusion? Where the methods are large quantitative studies and large qualitative studies, one might hope that the discussion and conclusions are not based largely on the findings from one method. In one study, a very large survey was consigned to offering illustrative statistics and providing context for the qualitative interviews; and the focus of the discussion was on the results from the qualitative study.

and papers in preparation. Empirical study of the four HSR mixed methods studies identified a further issue. The existence of different types of publications was not the only issue to consider. Researchers took a number of approaches to making connections between the publications emerging from a study. In an article focused on one method, the researchers could report that the method was part of a wider study, alerting the reader to the fact there were other pieces of the jigsaw puzzle to locate, or they could bring in the findings from a previous publication to inform, contextualise or help generalise the findings of a second paper. Therefore the explicit connections which authors made between papers were also studied. A typology of publications emerging from studies was devised (Box 3.4).

Most questions were relevant to both research proposals and reports but some were specific to one only. The question about publications was relevant to completed studies only. At least a two year 'window of opportunity' was allowed for publication between the end of the study and the assessment made here.

Box 3.4 Typology of publications emerging from mixed methods studies

1. No publications
2. Only qualitative component published
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
3. Only quantitative component published
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
4. Both components published separately
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
5. Joint paper(s)
 - (i) Separate sections in one paper
 - (ii) Relationship and influence between parts explicit

3.3.5 Applying the data extraction form

The Coding Sheet was piloted and a Coding Protocol was developed during this process to aid consistent application of the Coding Sheet. The Coding Protocol was a working document which developed throughout the process of coding studies. Copies of the final version of the Coding Sheet and the Coding Protocol can be found in Appendix C.

A Coding Sheet was completed for each study. First, the proposal was read and the sections about the proposal were completed. Second, the report was read and the sections about the report were completed. Third, any differences between the proposal and report were noted. Finally, publications were read and the section on publications completed. Data extraction of this type is open to different coders extracting different information (inter-rater reliability) and the same coder extracting different information at different times (intra-rater reliability). One way of avoiding this problem is to use auto-coding using computer software (Hodson, 1999). This was not feasible because documentation was not available electronically. Nor was it desirable because of the potential for misinterpretation using software. The Coding Sheet was applied to each study by one researcher (AOC) and so there was no inter-rater variability. However, a limitation was that this left the data extraction process unchallenged by an external source. The Coding Protocol was devised to reduce intra-rater variability but levels of variability were not formally tested.

3.3.6 Analysis

There was one method of data collection, with both structured and unstructured data collected. That is, this component of the study involved intra-method mixing.

The structured data were entered into SPSS, a statistical package. The main analysis was descriptive, displaying the proportions of proposals, reports and publications in each pre-specified category, for example the proportion of proposals having a particular characteristic. Chi-squared tests were undertaken to explore associations between contextual variables and the quality of studies, with the recognition that the power to detect differences was low given the small number of studies available.

Free text comments were transferred to a WORD document and an inductive approach was taken to their analysis. They were grouped under *a priori* themes based on the aspects of quality described in Section 3.3.4, namely transparency, appropriateness, validity, feasibility, sophistication, expertise, integration, success and yield. Some new themes were identified at this stage e.g. terminology. Each comment was grouped into a theme and labelled with its original study number and whether it was based on a proposal or a report to allow easy access back to the original work. Then the comments within each theme were read and sub-themes identified. Numbers of studies falling into each sub-theme were counted.

When reading the open comments for the structured questions, the dichotomy of 'yes' and 'no' used in the structured questions seemed inadequate. A further option of 'yes, but more possible' was added at the data entry stage where the structured question was answered as 'yes' but open comments revealed some concerns.

Finally, a longitudinal approach to analysis was undertaken by considering the structured data and free text comments on the proposal, report and publications within a study. An attempt was made to characterise the relationship between qualitative and quantitative methods throughout the progress of each study for which full documentation was available. This was an inductive process with a characterisation made of each study – for example 'the qualitative component not present at proposal stage, appears with some strength at report stage, and is the focus of a number of publications'. Patterns were looked for across these characterisations and then themes were built up based on patterns emerging from individual studies – for example 'the increasingly visible method'.

3.3.7 Numbers of studies included in the documentary analysis

In reporting a quantitative study it is usual to describe numbers of participants and response rates in the first part of the results section. However, the presentation of mixed methods studies can be challenging (see Chapter 2) and standard approaches may need to be changed. In order to allow findings of the documentary analysis and the interview study to be reported together, the numbers of studies included in the documentary analysis is reported here.

Numbers of mixed methods studies identified

Within the ten Department of Health programmes, covering the period 1994-2004, 761 studies were listed as single projects, were focused on health issues, and were not explicitly labelled as systematic reviews. A small number of these, 37 (5%), had no information other than the title, and further details could not be located on the National Research Register or ReFer. Of the remaining 724, 51 (7%) were excluded on reading the summary because they were literature reviews or systematic reviews only, and 26 (3%) because they were based in laboratory research or were not empirical research. 647 primary health research studies were identified and 119 (18%) were classified as mixed methods based on reading the summary.

Response rate to request for documentation

When the lead researchers of each of the 119 mixed methods studies were written to for further information, responses were received from 50% (60/119) after the first mailing and 72% (86/119) after the reminder. One researcher reported that their study was not mixed methods because the summary on the funding body website had mixed up two different studies. This was removed from the sample, leaving 118 mixed methods studies. A response, but not the documentation, was received from 6 researchers: two researchers were on long-term sick leave or had retired and could not help; two researchers did not want to send documentation, one because they considered the research proposal to be a sensitive document which they did not wish to share publicly, and one because they considered their study to be a 'quick and dirty' project; and two researchers said that they would send documentation but did not, even after a reminder. Two non-responses were from completed studies funded through the HTA programme where reports are available online so these were included in the study and searches made for related publications. The final response rate of documentation available for a study was 81/118 (69%) of the mixed methods studies.

Non-response bias

The responses were reasonably representative of the population of mixed methods studies (Table 3.1) although there was some evidence of a lower response from studies addressing community-based issues and the interface between services, than for studies based in primary or secondary care. Telephone and email contact with some researchers suggested that the request was perceived as a burden in the lives of busy researchers, although these researchers usually then sent the documentation.

Table 3.1 Response rates to requests for documentation for mixed methods studies

Characteristic	%	(n/N)	p-value for difference in response rates
Funding body			0.12
SDO and NEAT	73%	(22/30)	
HTA	93%	(13/14)	
NHS R&D past programmes	60%	(27/45)	
PRP	65%	(19/29)	
Year of funding			0.44
Pre 1995	62%	(15/24)	
1996-1998	76%	(28/37)	
1999 -2001	58%	(14/24)	
2002-2004	73%	(24/33)	
Cost+			0.48
< £50k	82%	(9/11)	
£51-£100k	65%	(15/23)	
£101-£200k	59%	(16/27)	
£201-£300k	67%	(12/18)	
> £301k	78%	(25/32)	
Status			0.36
Complete	66%	(57/86)	
Ongoing	75%	(24/32)	
Sector			0.06
Primary care	82%	(23/28)	
Secondary care	78%	(21/27)	
Community	48%	(11/23)	
Interface	56%	(9/16)	
Mixed/Other	68%	(16/23)	
Type of study			0.74
Survey + qualitative	64%	(33/52)	
Evaluation + qualitative	72%	(21/29)	
RCT + qualitative	75%	(15/20)	
Other	71%	(12/17)	

+Some totals do not add up to 118 because some information was missing on a small number of studies

Further exclusions

The definition of a mixed methods study identified in Chapter 2 was applied to the documentation received. Six studies were reclassified as not meeting the criteria for inclusion in this study (See Box 3.5). This highlighted the difficulty of applying a definition of mixed methods to research summaries. This left 75 mixed methods studies for further investigation.

A further issue was that two researchers who sent documentation felt that their studies were not mixed methods. One study (s73) was a case study design which was primarily qualitative but which included the collection and analysis of routine data. In an email, the researchers said the study was “completely qualitative” but acknowledged that the routine data might turn out to be bigger than anticipated. Interestingly, the researchers used the term ‘mixed method’ to describe their study in the documentation and ‘multi-method’ to describe the mixture of qualitative methods. Another researcher (s56) did not give a reason for not thinking that their study was mixed methods even though they were using a mixture of qualitative and quantitative methods in the context of instrument development. Both of these studies met the criteria for inclusion and are part of the 75 studies investigated below.

Documents included

Full proposals should have been available for all 75 studies and were obtained for 60% (45/75). Researchers reported said they could not find the proposal because it was archived or lost, or they simply sent the report without the proposal. Final reports were only available for the completed studies in the sample and were obtained for 92% (48/52), although in two cases the reports were summary reports. The numbers of documents available for the 75 studies are shown in Table 3.2.

A guideline for sample size in a quantitative approach to documentary analysis is that univariate and bivariate analysis can be undertaken on 40 to 50 cases (Hodson, 1999), although a justification for this is not offered. Applying a standard sample size calculation for comparing two proportions shows that detecting a difference between two proportions 0.5 and 0.15 with 80% power at the 5% significance level requires 24 studies in each group. Thus the small sample size in this study only allows detection of fairly large differences between different types of proposals and reports.

Box 3.5 Reasons for excluding some studies from the documentary analysis

1. The abstract of one study (s17) was totally quantitative but a listed publication was qualitative. On reading the proposal and report, it transpired that advantage had been taken of the quantitative study to undertake an unfunded qualitative study.

2. One researcher sent the documentation warning that their “study used largely quantitative methods” (s92). On reading the documentation it was clear that it was a fully quantitative study. The abstract of the study on the funding database referred to the use of ‘semi-structured interviews’ and a ‘survey’. However, the survey was applied through use of semi-structured interview and did not fit the definition of mixed methods used here. A survey administered by semi-structured interview also occurred in another study (s108).

3. One study was not research (s103) but rather a policy guidance document.

4. A researcher sent documentation with the proviso that they did not think that it was mixed methods (s112). They had used the term ‘semi-structured telephone interviews’ in the abstract but these turned out to be discussions with clinicians by telephone to gather quantitative data to fill a quantitative model. They were called ‘discussions’ rather than interviews in the report and no details were given about the method.

5. In the summary proposal for one study (s118), which included an investigation of the effectiveness of an intervention and its delivery, the researchers stated that ‘semi-structured interviews’ would be used to assess subjective report of outcome. However, in response to the request for documentation, the researcher responded that the study did not include qualitative research but that the interviews were part of the quantitative research and did not follow the rigour of a qualitative interview. In the publication from the study, the interviews were not described in the methods but the main points emerging from the interviews were reported alongside the results of the quantitative methods and served to confirm poor compliance with the intervention and illuminate reasons for this.

Table 3.2 Documents available for the 75 mixed methods studies included in the documentary analysis

Documents available	%	(n)
Proposal only	31%	(23)
Report only	13%	(10)
Publications only	3%	(2)
Proposal and report	3%	(2)
Report and publications	24%	(18)
Proposal and publications	3%	(2)
Proposal, report and publications	24%	(18)
Total	100%	(75)

There were 45 proposals and 48 reports included in the documentary analysis. Two of the 45 proposals were excluded from the analysis of the characteristics of mixed methods studies because these studies were not mixed methods studies at the proposal stage. However, they were included in the analysis of the quality of studies because the planned nature of the mixed methods study is a possible indicator of quality. Two of the 48 reports were summary reports, one being as long and detailed as a full report. However, the other was detailed enough for determining characteristics of the study but not for assessing the quality of the study. Therefore only 47 reports are included in the analysis of quality.

For 49 of the studies there was at least a two-year period between the end of the study and the assessment in this thesis, to allow time for publications to emerge. These 49 studies were included in the assessment of publications. For 20 studies the proposal, report and opportunity to produce publications was available, and these studies were included in the longitudinal analysis of the quality of mixed methods.

3.3.8 Background details of the 75 mixed methods studies in the documentary analysis

There was an even distribution of studies across funding programmes and year of funding, with the exception of the NEAT funding stream in which there was only one study (Table 3.3). The

studies were mainly evaluations and combinations of survey and fieldwork, with few feasibility and instrument development studies. It was by no means unusual to have research teams of 5 or more applicants/authors from different departments, universities and regions (see Table 3.4). Medicine was the most common discipline of the lead researcher.

Table 3.3 Description of the 75 mixed methods studies in the documentary analysis

Characteristic	%	(n)		
Funding programme				
SDO	27%	(20)		
HTA	17%	(13)		
NHS R&D	33%	(25)		
PRP	21%	(16)		
NEAT	1%	(1)		
Year of funding				
Pre 1995	20%	(15)		
1996-1998	33%	(25)		
1999 -2001	17%	(13)		
2002-2004	29%	(22)		
Type of study				
Evaluation	47%	(35)		
<i>RCT</i>			18%	(14)
<i>Other</i>			28%	(21)
Feasibility study	7%	(5)		
<i>RCT</i>			4%	(3)
<i>Other</i>			3%	(2)
Fieldwork and survey	40%	(30)		
Instrument development	7%	(5)		
Total	100%	(75)		

Table 3.4 Contextual information about the 75 mixed methods studies

	Proposal (N=45) % (n)	Report (N=48) % (n)
No. of applicants/authors		
1-4	27% (12)	42% (20)
5-8	29% (13)	38% (18)
9-17	27% (12)	17% (8)
Not known	18% (8)	4% (2)
No. of departments		
1-2	20% (9)	48% (23)
3-5	24% (11)	33% (16)
6-10	20% (9)	6% (3)
Not known	36% (16)	12% (6)
No. of organisations		
1-2	36% (16)	60% (29)
3-4	24% (11)	27% (13)
5-10	11% (5)	4% (2)
Not known	29% (13)	8% (4)
No. of geographical areas		
1	31% (14)	52% (25)
2	24% (11)	19% (9)
3-8	16% (7)	19% (9)
Unknown	29% (13)	10% (5)
Discipline of lead applicant/author		
Medicine	60% (27)	35% (17)
Economics	7% (3)	6% (3)
Nursing/midwifery	7% (3)	6% (3)
Psychology	9% (4)	4% (2)
Sociology	2% (1)	10% (5)
Other e.g statistics, politics	0% (0)	6% (3)
Not known	16% (7)	31% (15)

3.4 Interview study of researchers

3.4.1 Identifying researchers for interview

The focus of the study was mixed methods research in HSR and it was considered appropriate to interview researchers with experience of mixed methods studies in HSR. There is no publicly available sampling frame of researchers who have undertaken mixed methods studies in HSR. However, the documentary analysis described in Section 3.3 identified mixed methods studies in HSR. Researchers' names were available from lists of applicants on proposals, lists of authors on reports, and lists of authors on articles. Information from these studies acted as a source of researchers participating in mixed methods studies in HSR in England between 1994 and 2004.

Researchers' views and experiences of mixed methods studies may differ depending on their background and the types of mixed methods studies they have experienced. Purposive sampling was undertaken (Murphy et al., 1998) to include a range of types of researchers and a range of types of mixed methods studies. Efforts were made to include qualitative researchers, quantitative researchers, and those able to engage with both methodologies (mixed methodologists), because these three groups are likely to take very different perspectives on how mixed methods studies are implemented. Efforts were made to include researchers who had worked on different types of mixed methods studies, in particular evaluations, instrument development, and fieldwork with surveys, because the issues important to these types of studies might differ. The purpose of this sampling strategy was to reflect the diversity of researchers and studies and to engage with issues specific to these groups. A further sampling purpose was introduced as the interviews progressed and data extraction for the documentary analysis was completed. An effort was made to include researchers who had worked on studies which had been assessed as exploiting the potential of mixed methods research, or not, in the documentary analysis. The purpose of this latter sampling strategy was to ensure that both facilitators and barriers to exploiting the potential of mixed methods studies could be explored. This aspect of the sampling strategy was important to the 'mixed methods analysis' discussed later in Section 3.5. Finally, an effort was made to ensure maximum variation within the sample by including research situated in different types of departments such as nursing, research units, primary care, and psychiatry; and research funded from different sources.

3.4.2 Ethics

A proposal was written for the interview study and submitted to the Ethics Committee in the School of Health and Related Research for guidance on submitting the study to a Multi Research Ethics Committee. An application to an NHS Research Ethics Committee was not required because the study did not involve NHS patients or staff (see 3.1 of Governance arrangements for NHS Research Ethics Committees, July 2001

www.doh.gov.uk/research/documents/gafrec.doc accessed 4/8/03). It was noted that some of the participants would have contracts with the NHS, related to their clinical duties. However, they would participate in this study in their capacity as researchers rather than health professionals, and their NHS links were not of interest within the study.

Even though the study did not go through an NHS Ethics Committee, attention was paid to ethical issues. Deontological ethics, where the focus is on the rights of individuals (Murphy & Dingwall, 2001), were relevant. Written informed consent was obtained from all participants for the interviews (See Appendix C). Consequentialist ethics, where the focus is on the outcomes of the research, were also relevant. The greatest risk of harm from qualitative research may occur on publication (Murphy & Dingwall, 2001) when participants can be concerned about the researcher's interpretation, may recognise themselves and feel at risk of recognition by others, or hear the views of others which are shocking or hurtful. Identification of individuals was highly relevant to this study because the interviews involved researchers from a fairly small community – health services research in England – and publications from the interviews would appear in research journals that they read. For this reason attention was paid to anonymisation of individuals participating in the research, at all stages of the research process. Anonymity and confidentiality were explained to participants in an information sheet (see Appendix C). Names of participating researchers, projects or universities were known only to the lead researcher of this study and were not shared with others. Transcripts were anonymised by removing names of researchers, projects, and universities. Anonymised transcripts were sent back to participants asking them to indicate tracts which they would prefer were not displayed in publications. They were given a month to respond, after which it was assumed that the whole transcript could be used. Finally, care was taken when labelling verbatim quotes because of the risk of identification of participants.

3.4.3 Access and data collection

A semi-structured topic guide was drafted based on the issues identified in a preliminary literature review undertaken for an MA in Research Methods (O'Cathain, 2003). Questions were open to allow the interviewees to discuss issues of importance to them. The topic guide was tested in a pilot study (see Appendix B) and then reassessed based on the extensive literature review in Chapter 2. A key feature of the topic guide was a focus on the study in the documentary analysis by which the interviewee had been sampled, as well as their general views of mixed methods research. For example, if a researcher had produced a mixed methods article then they were asked how that publication had come about. As the interviews progressed, the topic guide changed. Preliminary analysis of the first ten interviews highlighted the importance of how the research team worked together on a study and this issue was added to the topic guide (see Appendix C for final topic guide).

When individuals were selected for interview, they were sent a letter asking for written informed consent to participate in an interview. An iterative approach was undertaken to data collection. Ten researchers were selected, consented, and interviewed. A preliminary analysis was undertaken of these ten interviews to inform future sampling decisions and the topic guide for future interviews. A further set of 6 interviewees were selected to fill gaps in the sampling process. For example, quantitative researchers tended to be the Principal Investigators on a study and the qualitative researchers tended to be applicants or contract staff, so an attempt was made to interview more of a spread of researchers across the research team spectrum. Two researchers did not respond to this request and another 6 interviewees were selected to fill any gaps in the sampling process.

Interviews took place at researchers' workplaces either in the privacy of their own offices or in a private meeting room. One interview took place in a very large open plan office. The space felt private because it was enclosed and nearby desks were not occupied. One interviewer (AOC) undertook all the interviews using the topic guide. Interviews were recorded using a tape recorder for the first ten interviews and then a digital recorder for the last ten interviews. Written notes were made during the interviews in case the recorder failed. Any observations or reflections were written up immediately after the interview.

3.4.4 Sample size

Determining a sample size in qualitative studies is difficult. Practical, as well as theoretical, considerations determine sample size, with a trade-off between depth and breadth (Hammersley & Atkinson, 1995). The proposed sample size was 20 researchers with recognition that this might change during an iterative process of data collection and analysis. Data saturation, where no new insights are gained from adding further cases to the sample, is more associated with theoretical sampling than the purposive sampling used here (Ritchie et al., 2003). Nonetheless it is a useful concept to consider even in purposive sampling. The interviews were an hour long on average and covered an extensive amount of relevant issues. A preliminary analysis of the first ten interviews gave a detailed understanding of the content of the interviews. By the 15th interview the interviewer noted that few new insights were emerging. After this, at the end of each interview, the interviewer explicitly reflected on whether any new insights had emerged from an interview. By the time 20 interviews had been undertaken it was felt that the available data were of sufficient breadth and depth to address the research question.

3.4.5 Description of interviewees

In a report of a qualitative study, the description of interviewees might usually be situated with the findings. Because this qualitative study is a component of a mixed methods study, the interviewees are described here in the methods section.

The sample included a range of types of researchers and yield from studies, as planned (see Table 3.5). There was also diversity of sample across different funding bodies and researchers from different disciplines. The type of study was mainly evaluation, both randomised and non-randomised; the two non-responders to a request for an interview had led 'survey and fieldwork' studies. The sample was drawn from applicants on proposals, as well as authors on reports and articles, and thus may have excluded contract researchers who had been brought in specifically to deliver data and analysis. Only three such researchers were interviewed, two because they were first authors on an article and the other because the study lead who had been written to referred the letter of invitation to the contract researcher. Given the importance of team working in the analysis (see Chapter 6), the voice of the contract researcher may be poorly represented here.

Table 3.5 Description of interviewees

Characteristic		N=20
Type of researcher (pre- interview)	Quantitative	11
	Qualitative	9
Type of researcher *(post-interview)	Quantitative/ Trialist	8
	Qualitative	6
	Mixed	4
	Health Services Researcher	4
Type of study	Evaluation with RCT	6
	Evaluation other	8
	Survey and fieldwork	4
	Instrument development	2
Exploitation of mixed methods	Good	9
	Poor	11
Funding programme	SDO	6
	HTA	4
	DHPRP	5
	R&D	5
Status on team	Principal Investigator	11
	Applicant	6
	Researcher	3
Status of project	Complete	13
	Ongoing	7
Gender	Male	8
	Female	12
Disciplines*	Sociology	6
	Medicine	5
	Psychology	4
	Other = philosophy, nursing, geography, statistics	7

* Some interviewees used two categories when describing themselves

3.4.6 Data preparation and quality

Interviews lasted an hour on average, varying between 35 minutes and 90 minutes. A clerical officer transcribed the interviews verbatim. The analyst listened to recordings and filled in any gaps left by the clerical officer and rectified any mistakes in the transcripts. This was a time consuming but necessary process to ensure that the transcripts were accurate, while recognising that transcripts can never be a fully accurate representation of an interview. The recordings were of good quality, particularly after the tenth interview when a digital recorder was used. The recording undertaken in an open plan office was poor because the interviewee spoke in a lowered voice. Only half of the recording was useable and written notes made during the interview were used to supplement the recording. The battery ran out in a later interview and only 12 minutes of an hour long interview was recorded and transcribed verbatim. The remaining part of the interview was constructed using notes made during the interview and expanded notes made immediately after the interview. Both of these transcripts were checked by the interviewees and passed as a record of the interview. The topic guide was applied within all the interviews, except the shortest interview, where the interviewee arrived late and had another meeting to attend after the interview. The focus of this interview was the core questions about the study in the documentary analysis rather than background context.

3.4.7 Analysis

The first stages of Framework were used to analyse the data (Ritchie & Spencer, 1994). Framework was chosen as a suitable approach because it allows the researcher to explore their agenda explicitly while also allowing other themes to emerge from the analysis. The first stage of Framework is familiarisation with the data. Data preparation helped with this, as tapes were listened to during transcript checking. Transcripts from the interviews were read to aid further familiarisation with the data, and a short summary of each transcript was written to help to keep a case focus within the analysis. The second stage of Framework is to identify a thematic framework which categorises issues within the transcripts. A framework was developed based on familiarisation with the first ten transcripts. It included *a priori* themes such as researchers' understanding of quality in mixed methods studies, and emerging themes such as 'respect'. The themes were mainly descriptive, for example, whenever researchers explicitly or implicitly talked about paradigms this was organised under a theme 'paradigms'. A conceptual theme of 'power' was explored at this stage, which described which agencies exercised power and how power was exercised. This conceptual theme arose from the analyst's *a priori* interest in power dynamics and mixed methods research. The third stage of Framework is indexing, where the thematic framework is applied to the transcripts and all parts of the transcripts are coded. The

thematic framework was applied to the first ten transcripts and all parts of each transcript were coded to a theme or sub-theme using the computerised qualitative software package WinMAX (Kuckartz, 1998). The fourth stage of Framework is charting where data extracts in a single theme are displayed in a table format for each interviewee. This final stage was not undertaken, but rather the strengths of WinMAX were exploited. WinMAX allows the researcher to print out all data extracts within a theme, with each extract labelled with the ID of the interviewee and the location of the extract in the transcript. The data extracts for each theme or sub-theme were read and further coding was undertaken within them to organise and understand the data.

Each theme and sub-theme was read and a preliminary set of findings was written up based around the conceptual theme of 'power'. Sociological theories of power were read and used to explore the sub-themes within the theme of 'power'. This process helped to highlight different aspects of the data but did not aid an understanding of how researchers could exploit the potential of mixed methods research and so this line of analysis was abandoned. Instead, the way in which teams worked together was identified as an important aspect of the data which would help to address the research question. The topic guide was changed to reflect this, with the addition of two questions about how the team on the study was formed and worked together. By this stage the analysis of the quantitative documentary analysis had been completed. This highlighted the lack of integration of methods within study proposals, reports, and publications and more prompts were used in the interviews to explore barriers and facilitators to integration.

A further ten interviews were undertaken, transcribed, read, and summarised. The thematic framework was reassessed in the light of these further interviews (see Appendix D). The new framework was largely similar to the original set of themes, although the conceptual theme of power was removed and other sub-themes identified. Coded extracts of the first ten interviews were recoded to the new set of themes using the software. The last set of ten interviews was coded using the new thematic framework. Data extracts in each theme and sub-theme were printed out and read with the research question in mind – how did the content of each theme help to understand how researchers did or did not exploit the potential of mixed methods studies. During this process the analyst identified an article on interdisciplinary team working as significant to the analysis (Robertson et al., 2003). The way in which interdisciplinarity was discussed reflected some of the key issues in the interview data around integration of methods. Further articles were identified on interdisciplinarity (Rosenfield, 1992; Tress & Tress, 2005; Tress et al., 2005) and these shaped the connections the analyst made between different themes.

3.5 Combining methods

3.5.1 Purpose and process

As described in Section 3.2, the purpose of the mixing of methods in this study was complementarity, and both components had equal status. A secondary purpose of the mixing of methods was development, with the studies identified in the documentary analysis acting as a sampling frame for the interview study. The sequence therefore was that the documentary analysis was started first and all 75 studies for which documents were available acted as a sampling frame for the interview study. The data extraction for the documentary analysis was completed in the early stages of the interview study and the assessment of the extent to which the mixed methods aspects of a study were exploited was used to sample further interviewees. For example, researchers who had worked on studies where a component had disappeared at the publication stage, or the approach to mixing was assessed as excellent, were selected. Detailed questions specific to the study in the documentary analysis formed part of the topic guide for the interviews so that interviewees could elaborate on aspects of the study identified in the documentary analysis and why they had occurred.

3.5.2 Integration

An attempt was made to fully exploit the mixed methods aspect of this study by paying attention to integration. The approach to integration was informed both by the approaches to integration identified in the literature review in Chapter 2, and the empirical study of how integration was undertaken in the documentary analysis of studies in HSR in Chapters 4 and 5.

First, the integration between methods at the sampling and the data collection stages of the interview study was exploited. Researchers were selected from the documentary analysis based partly on whether their mixed method study had been assessed as exploiting the potential of mixed methods research. This sampling variable was then used explicitly in the analysis of the interview data to see how researchers talked about the team, analysis, and outputs of the study included in the documentary analysis. The process of integration involved creating an 'integration grid' based partly on Miles and Huberman's meta-matrix approach to cross-case analysis (Miles & Huberman, 1994) which has been used to display qualitative and quantitative data (Wendler, 2001) and partly on the 'charting' process in framework analysis where data

extracts for a theme are displayed in a table format for each interviewee (Ritchie & Spencer, 1994). In the integration grid, the studies included in both the documentary analysis and the interviews were listed in the rows. The first column displayed the quantitative assessment of the outputs of the study and further columns the themes identified in the interview analysis. Cells were filled with each interviewee's account of a theme *specific to the study in the documentary analysis*. There were 20 studies included in both the interviews and the documentary analysis but data were available on 21 studies because one researcher had worked on two of the studies and talked about both of them during the interview. This grid was completed for all studies but was most useful for the 13 completed studies because a more objective measure of exploitation was available for these studies in terms of the types of publications which emerged (see Appendix D for grid). This grid was used in the context of the qualitative analysis, specifically using negative cases to deepen the analysis. It proved particularly helpful when exploring the need for senior expertise in qualitative research on a mixed methods study (see Chapter 6).

Second, issues identified in the analysis of the interview data were used as hypotheses for testing, where possible, within the larger dataset in the documentary analysis. This approach to integration was undertaken in the context of a quantitative analysis and is reported in Chapter 7. Although it is not unusual for qualitative research to raise hypotheses for testing in quantitative research, it may be unusual to do so in the context of a mixed methods study where the quantitative data have already been collected. This analysis should be seen as experimental but not unique - the analyses of process evaluations are being used to raise hypotheses for testing in concurrent outcome evaluations (Oakley et al., 2004), although the details of how this has occurred are awaiting publication.

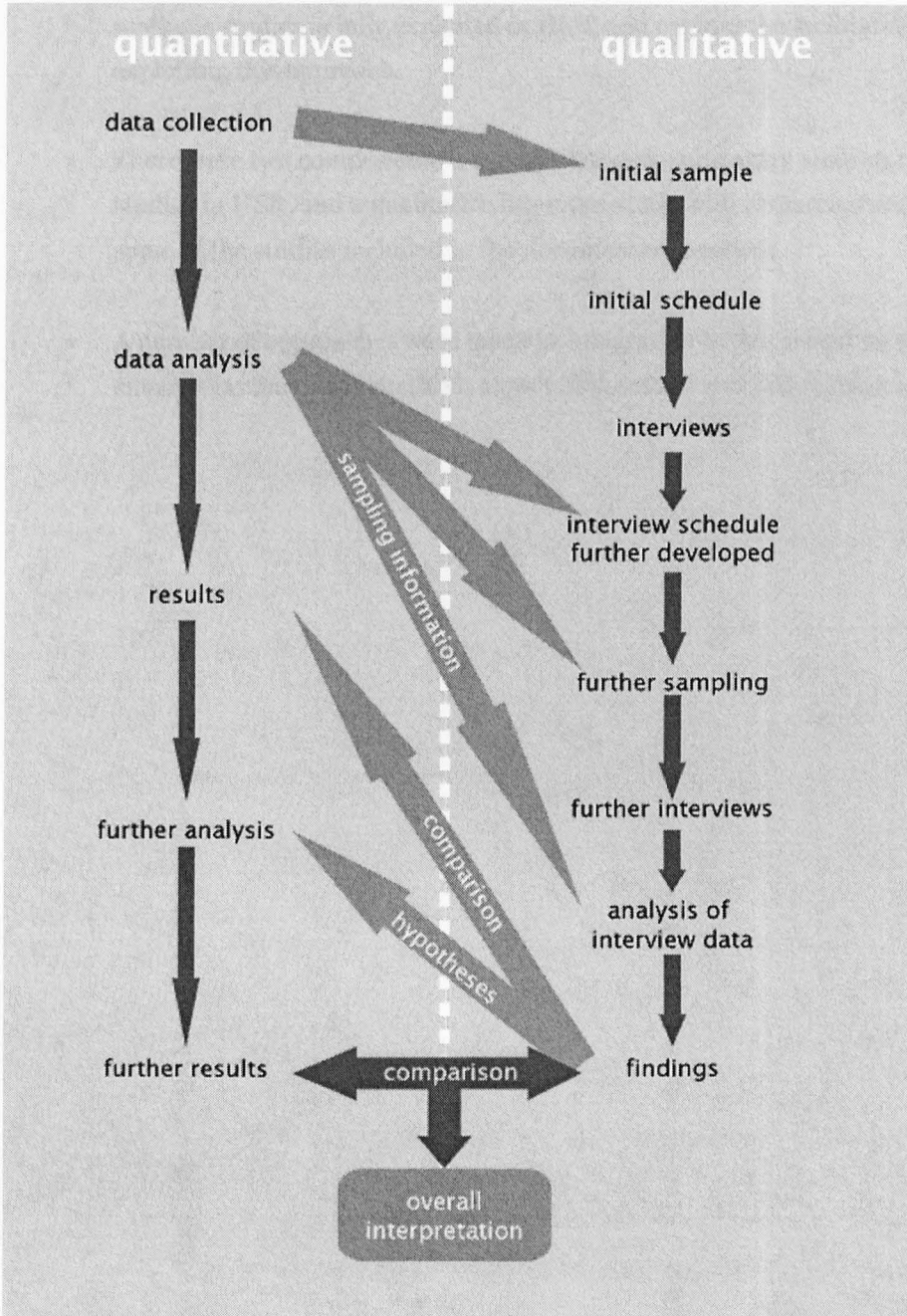
Third, findings were crystallised both within the results chapters (Chapters 4-6) and the discussion chapter (Chapter 8). Each data set was analysed separately and then findings were compared. Some findings from each component were on the same issue, for example 'quality'. These findings were brought together to consider how they gave a more rounded picture about an aspect of mixed methods studies and are reported together in the results chapters. It was hoped that this more integrated approach to reporting findings would allow more connections to be made between the findings from different components by both the analyst and the reader than the alternative approach of reporting findings from both components separately and discussing interpretation of both sets of findings together in the discussion.

3.5.3 A visual model of this mixed methods study

The visual model of this study in Figure 3.1 is considerably more complicated than the one of the evaluation of leaflets in maternity care (Figure 2.1 in Section 2.10.10).

3.6 Summary

Figure 3.1 Visual model of this mixed methods study



3.6 Summary

- A mixed methods design was undertaken to address whether the potential of mixed methods studies is fully exploited in HSR, and explore the facilitators and barriers to exploiting this approach.
- There were two components – a quantitative documentary analysis of mixed methods studies in HSR, and a qualitative interview study with researchers who had worked on some of the studies included in the documentary analysis.
- A number of approaches were taken to integration in this mixed methods study to ensure that the mixed methods aspect of the study was fully exploited.

Chapter 4 Characteristics of mixed methods studies in health services research

4.1 Introduction

One way in which the HSR community might exploit the potential of mixed methods studies is to draw on the range of ways in which mixed methods research can be used. The variety of ways in which mixed methods research can be used was identified in the literature review in Chapter 2. The variety of ways in which mixed methods research has been used in HSR is identified in this chapter. Prior to this, to contextualise these findings, the frequency of use of a mixed methods approach in HSR is reported, and some of the mixed methods studies included in the analysis are described in more detail.

4.2 Incidence of mixed methods studies in HSR

Within the ten Department of Health programmes, 119 (18%) of the 647 primary health research studies identified were classified as mixed methods (See Table 4.1). No attempt was made to consider whether this was an appropriate proportion for the types of questions being asked in HSR, that is, whether the proportion *should* have been 2% or 82%.

The proportion varied by the year the study was commissioned, increasing from 17% in the mid 1990s to 30% in the early 2000s (Table 4.1). However, there is some uncertainty around whether the use of a mixed methods approach increased over this time period in HSR. The proportion of mixed methods studies varied by funding programme, and different programmes dominated different time periods. Additionally, the ability to accurately classify a study as mixed methods research depended on the level of detail available for each study, and this varied between and within funding programmes. For example, the summaries of proposals on the SDO

database were more detailed than those on the PRP database. The HTA report summaries for completed projects were much more detailed than the proposal summaries for ongoing projects. The impact of this was most apparent for the HTA programme where 25% (9/36) of completed studies were classified as mixed methods compared with only 4% (5/114) of ongoing ones.

Table 4.1 Incidence of mixed methods studies commissioned by the Department of Health Research & Development programme 1994–2004

Source	Start date	Number of primary research health studies	Number of mixed methods studies	% mixed methods
SDO	Pre 1995	0	0	28/61=46%
	1996-1998	0	0	
	1999 -2001	9	2	
	2002-2004	52	26	
HTA	Pre 1995	16	3	14/150=9%
	1996-1998	45	3	
	1999 -2001	55	4	
	2002-2004	34	4	
NEAT	Pre 1995	0	0	2/21=9%
	1996-1998	0	0	
	1999 -2001	9	1	
	2002-2004	12	1	
NHSR&D Maternal and child health	Pre 1995	0	0	8/48=17%
	1996-1998	48	8	
	1999 -2001	0	0	
	2002-2004	0	0	
NHSR&D CVD and stroke	Pre 1995	38	3	4/49=8%
	1996-1998	10	1	
	1999 -2001	1	0	
	2002-2004	0	0	
NHSR&D implementation	Pre 1995	25	8	10/28=36%
	1996-1998	3	2	
	1999 -2001	0	0	
	2002-2004	0	0	
NHSR&D primary secondary care interface	Pre 1995	62	11	11/62=18%
	1996-1998	0	0	
	1999 -2001	0	0	
	2002-2004	0	0	
NHSR&D primary dental care	Pre 1995	0	0	8/41=20%
	1996-1998	13	2	
	1999 -2001	28	6	
	2002-2004	0	0	
NHSR&D forensic mental health	Pre 1995	0	0	5/30=17%
	1996-1998	10	1	
	1999 -2001	7	2	
	2002-2004	13	2	
PRP	Pre 1995	50	8	29/157=19%
	1996-1998	60	11	
	1999 -2001	47	10	
	2002-2004	0	0	
All programmes	Pre 1995	191	33	17%
	1996-1998	189	28	15%
	1999 -2001	156	25	16%
	2002-2004	111	33	30%
Total		647	119	18%

Even though it is difficult to say with certainty that mixed methods studies are being used increasingly in HSR, perhaps the most interesting findings here are that even prior to 1995 a considerable proportion of HSR studies funded through these programmes were mixed methods studies, and that mixed methods studies are common within HSR.

4.3 Detailed description of some mixed methods studies in HSR

A brief description of the 75 mixed methods studies was given in Table 3.3 in Section 3.3.8. Prior to studying the characteristics of mixed methods studies in HSR, which involves breaking the studies down into parts, a more detailed description of some of the studies is given to help the reader to picture the types of studies included (Box 4.1).

Box 4.1. Examples of mixed methods studies in HSR*

Randomised controlled trial and interview study

A pragmatic randomised controlled trial was undertaken with 650 patients to determine the effectiveness of a home-based versus hospital-based cardiac rehabilitation service, with outcomes measured at 6, 12 and 24 months. An economic evaluation was undertaken alongside the trial. A qualitative study was undertaken with up to 80 non-attendees and non-adherers to provide insights about non-compliance with the service.

Fieldwork and survey

A cohort of 500 heavy drinkers was identified and followed up over ten years, with structured interviews every two years about their health, treatment seeking behaviour, etc. Sub-samples of the quantitative study were taken at each time period to explore issues in depth, for example 36 people who had taken action to reduce their drinking in the previous two years were interviewed.

Instrument development

Interviews with 13 patients and carers, and focus groups with 28 patients, were used to identify the issues important to patients experiencing the interface between primary and secondary care. These issues were used to design an instrument to measure experiences of the interface. The instrument was tested quantitatively on a series of three random samples of 300 patients before a final instrument was tested on 600 patients.

* *Whenever examples are given in this thesis they are considered to be examples of good mixed methods studies. Studies which have been assessed as not exploiting the potential of mixed methods research are never described in a way which might identify the researchers.*

4.4 Justification for using a mixed methods approach

The four main reasons for using a mixed methods approach, identified in the literature review (Chapter 2), were to ensure comprehensiveness, to increase confidence in findings, to act as a pragmatic substitute for an unobtainable single method (i.e. 'satisficing'), and to give voice to marginalised groups. An explicit justification for using mixed methods research was only given in one third of proposals and reports in the documentary analysis (see Table 5.1 in the chapter on quality). Any justification given was extracted in the open comments section of the Coding Sheet and then coded (Table 4.2). The main justification reported was comprehensiveness. Within this justification researchers specifically mentioned the strength of one method versus the weakness of another method to access certain types of knowledge, and the complexity of the issue under study. Rather than emancipation of a marginalised group being a justification, researchers expressed a desire to use qualitative research to bring a patient-centred approach in their study. A little used justification was for added confidence in findings; this is unlikely to be a problematic gap in HSR because of the problems identified with this justification in Chapter 2. Researchers did not report a justification of a mixed methods design replacing an infeasible mono-method approach.

Table 4.2 Justifications given for mixed methods in documentary analysis

Justification	Proposals (N=45)	Reports (N=47)
None	31	33
Comprehensiveness	13	12
<i>Strengths/weaknesses</i>	5	5
<i>Complexity of issue</i>	2	1
Confidence in findings	0	1
'Satisficing'	0	0
Marginalised groups	2	1
Other - good quality research	0	1

Adds to more than total due to two justifications given for one study

45 proposals and 47 reports of sufficient detail to assess quality included here

During the interviews, researchers' discussions of mixed methods studies confirmed some of the findings of the documentary analysis. They cited comprehensiveness as a driving force for the use of mixed methods studies in HSR, wanting to address a range of questions and obtain a

broader picture of a phenomenon. The complementary strengths and weaknesses of the two methodologies allowed a wider range of questions to be addressed. Comprehensiveness was seen as necessary due to the complexity of issues under research, either the disease or the intervention, and the difficulty of undertaking research in an ever-changing complex health service with a fast-moving policy agenda. The complexity of the research environment was also cited as the reason for a 'satisficing' justification for a mixed methods approach, where researchers felt they had to 'make do' with one design because the complex research environment was unsuitable for a mono-method approach.

I'm not saying all the time, but a lot of the time in research it's difficult to get the whole picture without both. R12

It's less about the intellectual issue of mixed methods, it's more about the context in which those studies are conducted. And [...] it seems to me they are necessary in areas of rapidly changing policy and practice. And because that's where they are conducted, they are inevitably complex and messy. R4

One argument for undertaking mixed methods studies was more prominent in the interviews than the documentary analysis. Researchers associated qualitative research with the views of patients and quantitative research with the researcher agenda. The patient voice was seen as important in HSR because of its usefulness in understanding the complexity of a disease or outcome or intervention, and in grounding the research more in the real world. Service providers were also considered to be important voices for this reason and researchers were keen that both sets of voices be heard for a more comprehensive understanding of issues.

until you get down to hearing the actual experience, how people have described what the [intervention] was like for them and the problems they had with it, and the difficulties they had with it, as well as the positives, that you really get down to the nitty gritty, just what it is about this actual intervention that works and for who. R11

The justifications for using a mixed methods approach were grounded in the applied nature of health services research, emanating from a need to engage with the real world and address policy related issues in a complex research environment, rather than any ideological stance. The desire to hear patient and provider voices was part of this applied and pragmatic approach rather than based on an ideology of emancipation of marginalised groups. There was also a personal enthusiasm for mixed methods amongst some of the researchers who felt that justification was needed for why a study was *not* mixed methods. These researchers had been inspired to use mixed methods by individual researchers or research projects earlier in their careers. Again, this enthusiasm was based on what researchers believed that a mixed methods

approach could deliver in the type of research field they worked in, rather than a belief in mixed methods *per se*.

it's got to be for the question. You can't just say 'we've all got to do mixed methods research'. It has to be 'what is the question, and which methods are the most appropriate ones to use in that circumstance', and that's got to be the driver. R17

Hopefully it will become, if it hasn't already, normal, a normal expectation. There'll have to be a reason for not having a kind of qualitative component for something rather than a reason for putting it in. R3

When discussing why they had taken a mixed methods approach, or why it was important to take such an approach, interviewees generally justified the inclusion of a *qualitative* component within a study. This reflects the context of HSR as predominantly quantitative with the increasing acceptability and use of qualitative methods alongside quantitative methods.

4.5 Range of methods used

In the documentary analysis, half the mixed methods studies were evaluations and a further third used a combination of survey and fieldwork to understand an issue (Table 4.3). There were few examples of feasibility studies or instrument development studies, and no needs assessments. The lack of needs assessments was likely to be due to the focus on HSR rather than public health. Two thirds of the studies were classified as explanatory rather than exploratory.

The qualitative component of most studies was an interview study, with some use of case studies and focus group studies. Case studies often included focus groups, interviews, documentary analysis and observation so these methods were more frequently used than suggested by Table 4.3. Even so, there appeared to be heavy reliance on interview studies within mixed methods studies in HSR. There was more variation in the quantitative component of studies, although some evidence of heavy reliance on surveys. This suggests that researchers in HSR could further exploit the potential of mixed methods research by drawing on a wider range of qualitative approaches rather than relying on interview studies.

Table 4.3 Methods used in the 75 mixed methods studies in HSR

Characteristic	Proposal (N=43) % (n)	Report (N=48) % (n)
Type of study		
Evaluation	53% (23)	46% (22)
Fieldwork and survey	35% (15)	40% (19)
Feasibility study	7% (3)	10% (5)
Instrument development	5% (2)	4% (2)
Needs assessment	0% (0)	0% (0)
Purpose of the study		
Explanatory	65% (28)	58% (28)
Exploratory	28% (12)	42% (20)
Both	7% (3)	0% (0)
Components*		
Qualitative:		
Interview study	79% (34)	67% (32)
Focus group study	12% (5)	23% (11)
Observation	2% (1)	10% (5)
Case studies	19% (8)	40% (19)
Documentary analysis	2% (1)	2% (1)
Other e.g. diaries	0% (0)	4% (2)
Quantitative:		
Survey	40% (17)	62% (30)
Other observational study	26% (11)	19% (9)
RCT	28% (12)	21% (10)
Other intervention study	28% (12)	23% (11)
Economic	40% (17)	23% (11)
Other	7% (3)	2% (1)

43 proposals and 48 reports of sufficient detail to assess characteristics included here

* adds to >100% because more than one method used in each component

4.5.1 Difficulties with terminology

There were a number of difficulties categorising methods. The first difficulty was that researchers used different language to describe what might in practice have been the same approaches. Some researchers used formal terminology whereas others described informal approaches. For example, some researchers reported undertaking documentary analysis whereas others reported that they read documents related to a service under evaluation; some researchers reported undertaking interviews with service providers to understand more about the service under evaluation whereas others described informal discussions. Only 'formal' data collection methods were categorised as components in Table 4.3.

The second difficulty was where formal research terminology was used to give credibility to what appeared to be informal processes, consultancy work, and 'quick and dirty' research. For example, the term 'in-depth interviews' was used in one study even when the researchers themselves acknowledged that they were undertaking a 'quick and dirty' piece of work. The term 'focus group' was used to describe what appeared to be a chat with four people. Approaches were categorised as components in Table 4.3 if researchers used formal research terminology.

The third difficulty was where the same terminology was used to communicate the use of different data collection methods. For example, a researcher might use 'face-to-face interviews' to describe both the quantitative data collection and the qualitative data collection in the same study, making the study hard to follow, or the term 'interview' to describe a survey administered by interview. Similarly, the term 'semi-structured' was sometimes used to describe both a schedule with open questions for use within a qualitative interview, and a survey instrument with both closed and open questions. This highlighted the need for more precision in the language used in mixed methods studies in HSR.

A further observation made about terminology when considering the methods used in studies was that the term 'qualitative interviews' in research proposals could be used to describe long in-depth interviews, 20 minute telephone interviews, or informal conversations. There may be a need for terminology to distinguish between the different types of interviews to be used, or researchers may need to explain explicitly that qualitative interviews will be 20 minute telephone interviews where notes are taken and a descriptive analysis undertaken, or hour long semi-structured interviews which are taped and transcribed and an interpretative analysis undertaken.

Some of these issues around terminology are unlikely to be specific to mixed methods studies, for example researchers using formal research terminology to describe what essentially are 'quick and dirty' techniques. Clarity around terminology is unlikely to help researchers to fully exploit the potential of mixed methods studies but may help them to communicate their studies more easily to the reader.

4.6 Roles of methods

The main roles of quantitative components in mixed methods studies were to describe a phenomenon, test the effectiveness of an intervention, and explain variability (Table 4.4). Roles specific to mixed methods studies were determining the sample for the qualitative component and generalising qualitative findings. This first role was used in a third of mixed methods studies but the latter role rarely occurred in the mixed methods studies here. This lack of use of quantitative methods in this role may reflect the dominance of quantitative methods in HSR (see Table 4.5 later) and the fact that the quantitative component is rarely in a supporting role to the qualitative component. Or this role may be used more in programmes of research rather than in single studies. Nevertheless it is a role that is not widely used and might be considered for more use. An innovative use of quantitative methods in HSR was where findings from the quantitative component helped to construct a topic guide for the qualitative component.

The main roles of the qualitative components were to explore an issue, and generate the content of a questionnaire or measurement tool, the latter being a role specific to mixed methods studies (Table 4.4). Qualitative research was also used to study a range of aspects of an intervention or service. However, there were some gaps in the roles taken by qualitative research. They were rarely used to generate hypotheses for testing within a study. Again, this may reflect the fact that single studies rather than programmes are included in this thesis. Their role in instrument development was clearly focused on identifying the content of a questionnaire and less so on further development of the questionnaire with cognitive testing etc. They were not used to determine which outcomes to measure in a study, and again this may reflect the fact that programmes of research are not included here.

Components could have more than one role within a study. For example, a qualitative component might be used both to explore an issue in its own right as well as to develop the content of an instrument. That is, a component might have a stand alone role as well as a supportive role in relation to another method.

Table 4.4 Roles of methods in mixed methods studies in HSR

Characteristic	Proposal (N=43)	Report (N=48)
Role of quantitative		
Test effectiveness	47% (20)	46% (22)
Describe	40% (17)	54% (26)
Explain variability	26% (11)	21% (10)
Determine sample for qualitative	35% (15)	40% (19)
Generalise the qualitative findings	5% (2)	4% (2)
Generate consensus	5% (2)	2% (1)
Psychometrically test	2% (1)	4% (2)
Provide topic guide for qualitative	2% (1)	4% (2)
Role of qualitative		
Develop the research question	0% (0)	0% (0)
Generate hypothesis	0% (0)	0% (0)
Establish theoretical framework	2% (1)	2% (1)
Determine sample	2% (1)	0% (0)
Generate content of instrument	30% (13)	10% (5)
Cognitively test instrument	9% (4)	6% (3)
Aid scale construction	0% (0)	2% (1)
Test validity of questionnaire	0% (0)	2% (1)
Develop intervention	16% (7)	13% (6)
Pilot intervention	2% (1)	2% (1)
Describe intervention	12% (5)	4% (2)
Study how intervention works	19% (8)	8% (4)
Study how the <i>service</i> works	5% (2)	13% (6)
Study intervention in practice	12% (5)	6% (3)
Process evaluation*	14% (6)	4% (2)
Views of intervention	2% (1)	8% (4)
Determine outcomes and measures	0% (0)	0% (0)
Improve trial methodology	5% (2)	2% (1)
Explore RCT as social construct	2% (1)	0% (0)
Facilitate user involvement	0% (0)	2% (1)

Explore an issue	33% (14)	38% (18)
Uncover issues inaccessible to quant	7% (3)	0% (0)
Explore acceptability of care	7% (3)	6% (3)
Assess effectiveness	0% (0)	2% (1)
Explain relationships	12% (5)	10% (5)
Explore issues from quantitative	7% (3)	4% (2)
Explore identified unusual groups	2% (1)	0% (0)
Offer case illustrations	5% (2)	6% (3)
Offer depth information on new cases	12% (5)	6% (3)
Confirm a quantitative finding	2% (1)	4% (2)
Understand results in real world	7% (3)	2% (1)

* the term 'process evaluation' is used when the researchers themselves used this term or when the focus was not simply on one aspect of the intervention

4.7 Purposes and processes of mixing

4.7.1 Purposes

The main purposes of mixing methods in studies in the documentary analysis were complementarity, expansion, and development, with no examples of salvaging or initiation. Confirmation was rarely the purpose of mixing methods in these studies (Table 4.5). This reflects the justifications for using a mixing methods approach in the first place, which were discussed in Section 4.4. Interestingly, the issue of salvaging was identified as the purpose of mixing by one of the interviewees who cited the purpose of the qualitative component of their study as 'potentially salvaging' if the RCT did not give a positive result because of the difficulty of publishing null trials. Indeed two other interviewees discussed the powerful contribution of qualitative research when a RCT gave a null result, although in those incidences the RCTs had been published without the need for 'salvaging'.

In seven proposals and reports researchers used the term 'triangulation' but tended not to explain what they meant by this. Where they did explain, it was undertaken for the purpose of credibility, and also for the purpose of a comprehensive and integrated discussion, that is,

crystallisation. Thus the problems identified with the term ‘triangulation’ highlighted in Chapter 2 were also apparent in HSR.

During data extraction there was difficulty distinguishing between the purpose of expansion and the purpose of complementarity. The separateness of the two components was the key issue used to distinguish the two, with separate components answering very different questions coded as ‘expansion’.

4.7.2 Priority

The priority of studies was mainly quantitative or equal, with very few studies with a qualitative dominance (see Table 4.5). This is not surprising given the history of HSR as drawing predominantly on quantitative methods, and perhaps it is surprising to find any studies with qualitative dominance. Nonetheless, one could argue that researchers could consider drawing more on qualitative-dominant methods to fully exploit the potential of mixed methods studies in HSR.

Determining dominance was not easy in practice. Researchers were rarely explicit about the priority of methods (see Chapter 5). Some were, by calling one method the “kernel” in a mixed design, or describing the RCT as “augmented” by the qualitative research, or stating that the quantitative methods were “fodder for the qualitative methods”. This categorisation therefore relied on judgement based on a range of issues such as the size of each component, the resources allocated to each component, the space allocated to each component in the report or proposal, the driver or real focus of the study, or the number of objectives addressed by each component (see Chapter 2). Sometimes the status was communicated by the fact that the qualitative method had one paragraph only in a large research proposal, or did not appear in the project timetable.

4.7.3 Timing

In two thirds of studies, methods were used concurrently (see Table 4.5) and in a slightly lower proportion they were used sequentially. A study could have a range of methods with three or four mixes occurring, some of which were sequential and some of which were concurrent. Sequential mixing processes tended to occur in phases of a study and two thirds of studies had two or more phases (see Table 4.5).

Table 4.5 Purposes and processes of mixing

Characteristic	Proposal (N=43)	Report (N=48)
Purpose of mixing methods		
Confirmation	2% (1)	6% (3)
Complementarity	60% (26)	40% (19)
Expansion	47% (20)	46% (22)
Development	44% (19)	35% (17)
Initiation	0% (0)	0% (0)
Salvaging	0% (0)	0% (0)
Priority		
Mainly qualitative	5% (2)	10% (5)
Mainly quantitative	65% (28)	54% (26)
Equal	30% (13)	35% (17)
Sequence		
Sequential	65% (28)	54% (26)
Concurrent	70% (30)	69% (33)
Number of phases		
1	33% (14)	44% (21)
2	49% (21)	42% (20)
3+	19% (8)	13% (6)
Unknown	0% (0)	2% (1)

4.8 Integration

Researchers were rarely explicit in their proposals about where integration between methods would occur in the study (see Chapter 5). Where no mention was made of it in the proposal an assumption was made that it would occur at the interpretation stage. Whereas most studies integrated at this stage, far fewer studies integrated methods at the design, sampling and analysis stages (see Table 4.6). Integration at the design stage occurred in 20-30% of studies, which in practice meant that the design of an instrument or intervention was dependent on the

qualitative component. In about a third of the studies, integration occurred at the sampling stage where the sampling of one method was dependent on the analysis of the other using either criterion or extreme case sampling. In only one fifth of studies were methods integrated at the analysis stage, with little use made of the types of mixing discussed in the literature review in Chapter 2. For example, data conversion, or the analysis of one component affecting the analysis of the other component, rarely occurred.

The main gap in the processes of mixing in the studies in the documentary analysis was the lack of integrating components at the analysis stage. A further indication of the degree of integration in studies was apparent in the reports. It was usual for the results arising from each method to be reported in separate chapters, with only a third of reports bringing findings or data from different components together within a chapter. This suggests that researchers could exploit more of the potential of mixing methods in HSR by addressing integration at the analysis stage of a study and combining findings within results chapters.

Table 4.6 Stage and type of integration in mixed methods studies in HSR

Characteristic	Proposal (N=43)	Report (N=48)
Stage at which mixing occurs		
Design	30% (13)	19% (9)
Sampling	37% (16)	40% (19)
Analysis	21% (9)	17% (8)
Interpretation	77% (33)	81% (39)
Dissemination		
Chapter per method		65% (31)
Results interwoven	N/A	31% (15)
Not enough information		4% (2)

4.9 Typologies

In the documentary analysis the plan was to apply each of the three typologies identified earlier to each mixed methods study. However, during the pilot of this process it was apparent that a number of combinations of qualitative and quantitative methods might be used within one study. For example, an interview study might be used prior to a quantitative method to develop a questionnaire and then another interview study might be used alongside the quantitative method to explore a different aspect of the issue under study. Therefore typologies were applied to each *combination* of methods within a study. There were 74 combinations of methods used within the 43 proposals and 69 combinations of methods within the 48 reports.

4.9.1 Usability of the typologies

The majority of combinations of methods were classified by the ‘Rossman & Wilson’ and ‘Caracelli & Greene’ typologies, whereas only 65% of the combinations in both proposals and reports were classified by the ‘Creswell’ typology (Table 4.7). Although this might indicate that the former two typologies were better suited to HSR, there were difficulties associated with all the typologies.

The difficulty presented by the ‘Rossman & Wilson’ typology was mainly that a combination of methods could fit into two categories, in particular that both corroboration and elaboration were intended and occurred in a ‘crystallisation’ process (see Chapter 2), or that one method was used to develop the sample for a second method but the role of the second method was also to elaborate on the findings of the first method. It was also difficult to understand the difference between ‘design’ and ‘analysis’ during data extraction. For the purposes of data extraction, the definition was that ‘design’ was relevant to the proposal and ‘analysis’ to the report.

For the ‘Caracelli & Greene’ typology there was difficulty distinguishing between ‘complementarity’ and ‘expansion’ in practice, and in determining whether one method was nested within another. The authors of the typology define ‘complementarity’ as where one method is dominant and the results of one method are enhanced by results from the other, whereas ‘expansion’ is where methods are undertaken more separately and possibly with equal status. In practice, the status of a method was difficult to determine within a study, as was its role in enhancing an answer or answering a separate question. ‘Nesting’ caused difficulties

because although it required that one methodology was located within the other, implying the dominance of one method, it was difficult to distinguish this from complementarity in practice.

The 'Creswell' typology rarely presented difficulties around distinguishing one category from another because the categories were very well defined and distinguished. However, there were no categories for a 'sequential development' approach where the priority of two methods might be the same, or a 'concurrent complementarity' approach where two methods are used at the same time to answer different-but-related questions. Also, the definitions were so detailed that studies tended not to fulfil all the requirements of a category, for example data conversion might not be specified, or one method was not necessarily dominant in a study.

In summary, none of the typologies could be used, without concerns, to categorise studies in HSR.

4.9.2 Frequency of use of different types

Some categories, which were present in all the typologies, were rarely used in HSR. Any category concerned with using one method to confirm another was rarely used, that is, triangulation, confirmation, or corroboration. This may reflect the fact that researchers in HSR justify their use of mixed methods with arguments of comprehensiveness based on the need to address a range of questions in a complex research environment (see Section 4.4). It may not indicate a need for improvement because of the problems with using methods for the purpose of confirmation (see Chapter 2).

Categories with a transformative aspect, that is where the spirit of the study is one of giving voice to less empowered groups in society, were rarely used. There was apparent discrepancy between this and the interview findings, where researchers cited 'giving voice' as a justification for the qualitative component of their study (see Section 4.4). This apparent discrepancy was due to this category being used in typologies to describe an overall thrust of a study to empower people, rather than this merely being a role of one of the components.

Also, some categories specific to each typology were rarely used. In the 'Rossman & Wilson' typology, 'design initiation' and 'analysis initiation' were never used (see Table 4.7). Initiation is considered to be where researchers are open to divergent findings which may challenge the

Table 4.7 Application of typologies to mixed methods combinations in HSR studies

Typology	Proposal (N=74)		Report (N=69)	
	%	(n)	%	(n)
Rossmann & Wilson				
Design corroboration	8%	(6)		
Design elaboration	51%	(38)		
Design development	39%	(29)		
Design initiation	0%	(0)		
Analysis corroboration			4%	(3)
Analysis elaboration			62%	(43)
Analysis development			33%	(23)
Analysis initiation			0%	(0)
Unclassifiable	1%	(1)	0%	(0)
Caracelli & Greene				
Component triangulation design	1%	(1)	1%	(1)
Component complementarity design	11%	(8)	13%	(9)
Component expansion design	18%	(13)	38%	(26)
Integrative iterative design	32%	(24)	33%	(23)
Integrative embedded or nested design	32%	(24)	13%	(9)
Integrative holistic design	0%	(0)	0%	(0)
Integrative transformative design	1%	(1)	1%	(1)
Unclassifiable	4%	(3)	0%	(0)
Creswell				
Sequential explanatory design	24%	(18)	17%	(12)
Sequential exploratory design	1%	(1)	10%	(7)
Sequential transformative design	0%	(0)	3%	(2)
Concurrent triangulation strategy	5%	(4)	3%	(2)
Concurrent nested strategy	32%	(24)	32%	(22)
Concurrent transformative strategy	1%	(1)	0%	(0)
Unclassifiable	35%	(26)	35%	(24)

conceptual framework of the study at the design stage, or use results from one method to challenge the interpretation of all the findings. In the 'Caracelli & Greene' typology the 'integrative holistic' category was not used. This encapsulates more of a needs assessment approach where lots of methods are used to design a concept map of an issue and may be more relevant to the needs assessment aspect of public health research than to HSR.

In summary, although some categories of some typologies were not used, this did not seem to identify problems or gaps in the types of mixed methods studies used in HSR.

4.10 Paradigms

Paradigms were one of the most frequently discussed issues in the literature on mixed methods research (see Chapter 2). Discussions focus on the incommensurability of paradigms associated with qualitative and quantitative research, paradigms as potential barriers to mixing methods, and the approaches to paradigms which may be suitable for mixed methods studies. In the documentary analysis of mixed methods studies in HSR, researchers were rarely explicit about the paradigms they researched within (see Table 4.8). Where no mention was made of paradigms these studies were categorised as 'implicitly positivist'. The predominance of positivism in mixed methods research has led another researcher to label mixed methods as 'positivism in drag' (Lynne Giddings, Australia, mixed methods conference in Cambridge 2005). In two proposals, researchers mentioned taking a transformative approach, one undertaking the qualitative research to give voice to users and the other undertaking participatory research. However, no detail was given about these approaches. Where one research team discussed this issue in their report, they discussed the stance of social action and symbolic interaction in their largely qualitative study. Researchers did however sometimes discuss paradigms in their peer-reviewed publications. Nonetheless, it is clear from this assessment that one of the most commonly discussed issues in mixed methods research is given practically no attention in mixed methods proposals and reports in HSR.

Table 4.8 Paradigms in mixed methods studies in HSR

Paradigm	Proposal (N=43)		Report (N=48)	
	%	(n)	%	(n)
Implicitly positivist	91%	(39)	90%	(43)
Emancipatory	7%	(3)	4%	(2)
Constructivist	0%	(0)	6%	(3)
Both positivist and constructivist	2%	(1)	0%	(0)

Ignoring paradigms in the documentation of mixed methods studies did not appear to be due to ignorance of these issues. Many of the interviewees had an understanding of the paradigm issues discussed in the literature. These interviewees were engaging with different methods in practice and, rather than discussing the philosophical issues around mixing methods, they were more interested in discussing the practical problems they faced (see Chapter 6).

4.11 Differences between the proposal and the report

Researchers could exploit the potential of mixed methods studies by avoiding types of mixed methods studies which tend to fail. To explore the extent to which this occurred, characteristics of studies were compared for the 20 studies where the research proposal and report were available. There was little evidence to suggest that some types of mixed methods studies were impossible. Instead there was more of an indication of the unplanned nature of qualitative components of mixed methods studies at the conception of the whole study, and a lack of clarity of intentions at the proposal stage. An assessment of any change between proposal and report within each study identified 11 studies where changes had occurred:

- In 3 studies the whole qualitative component or a part of the qualitative component was added to the study after the proposal had been written.
- In 3 studies there was a lack of clarity in the proposal about how the methods would work together and this only became clear in the report.
- In 1 study the qualitative component changed from being inappropriately large to a size more commonly used in qualitative research.

- In 1 study a multi-stranded complex evaluation changed over time with different qualitative and quantitative parts added and removed.
- In 1 study the qualitative component was never embedded in the study and was discussed differently in the proposal and report even though essentially it stayed the same.
- In 1 study a qualitative component turned into a quantitative component due to difficulties accessing a group for interview.
- In 1 study a quantitative component with a role of facilitating sampling for a qualitative component was lost without explanation.

Some researchers argue that mixed methods studies result in unexpected opportunities as they develop (Bryman, 2004) and so this change over time may not be a problem. However, it did appear to be problematic here because whole components were unplanned in some studies.

4.12 Summary

- One fifth of HSR studies funded by the Department of Health between 1994 and 2004 were mixed methods studies, with some evidence that this has increased over time.
- Researchers justified the use of a mixed methods approach on pragmatic grounds. They worked in an applied field studying complex issues in complex environments and therefore addressed a wide range of questions which were best addressed by both methodologies. The lack of other justifications for using mixed methods research did not seem problematic.
- Researchers in HSR drew on a wide range of roles for the different methods within studies, purposes of mixing, and types of mixed methods studies relevant to HSR.
- Existing typologies were not suitable for use in HSR due to the complexity of mixed methods studies and the difficulty of distinguishing between categories in typologies.
- Researchers were not explicit about paradigms in their proposals or their reports. Thus the most discussed aspect of mixed methods research in the literature was not discussed in study documentation.

- There was no evidence that some types of mixing did not work, although most studies appeared to change in some way between proposal and report. Some studies started out as mono-method studies and developed into mixed methods studies over time.

- Researchers could exploit more of the potential of mixed methods studies in HSR by
 - drawing on a wider range of qualitative methods than interviews
 - making more use of predominantly qualitative designs
 - integrating data and findings more at the analysis stage of a study
 - planning the use of both components at the proposal stage of the study.

Chapter 5 The quality of mixed methods studies in HSR

5.1 Introduction

The HSR community can only exploit the potential of mixing methods by undertaking high quality mixed methods studies. There are no existing quality criteria for application to mixed methods studies (Chapter 2). However, in the methods chapter (Chapter 3), a set of questions about aspects of quality of mixed methods studies was devised, based both on the literature review in Chapter 2 and empirical study of a small number of mixed methods studies in HSR. These questions were applied to the 75 mixed methods studies in the documentary analysis. Any observations or concerns were written in text alongside the tick box answers to each quality question. The findings here are based on both the structured and unstructured parts of this data collection.

Due to the lack of consideration given explicitly to quality in the literature on mixed methods, interviewees' perceptions of the meaning of quality in mixed methods studies were explored in the qualitative interviews with researchers. Researchers were asked about the aspects of their studies which had worked well and which had not, whether they felt they had produced good mixed methods studies, and whether they felt that they had exploited the potential of mixing methods within their studies. Researchers would often spontaneously discuss quality when describing the studies they had worked on. Ideally, these interviews would have been undertaken prior to the data extraction process so that the interviewees' views of quality in mixed methods studies could have been used to devise questions for the documentary analysis. However, gaining researchers' views of quality was not the primary purpose of the interviews and therefore their views are used in retrospect to consider the face validity of the questions in the documentary analysis.

5.2 Researchers' views of quality – getting quality into perspective

Researchers identified quality as a challenge within mixed methods research, both undertaking a quality mixed methods study and identifying the meaning of quality for mixed methods studies.

If people are starting to do that, then people are going to have to come up with ways of judging quality like you've just sort of hinted at before, and I suppose that's a wider challenge. R1

Interviewees cautioned against the attribution of poor quality mixed methods studies to the mixed methods aspect of those studies. They argued that poor quality research could occur in any type of study, particularly in complex policy related areas where mixed methods studies tend to be undertaken. They also felt that the yield from any study in terms of exploitation of individual methods and publications were never as high as researchers might want, regardless of the type of study undertaken.

I think when studies are unsatisfactory in one way or the other, that's not specific to mixed methods. I think it's much more generic things that don't go right. [...] So I can't say that those mixed methods that I've considered to be failures – have not been as productive as they might have been – has anything to do with mixed methods. R3

I'm sure that we could have done more. We could have done more thinking about the quantitative data, we could have done more thinking about the qualitative data. And we could have done more exploring the relationship between the two, and getting more synergy from them. I think that's true of every project that I've ever been involved with, whether it's mixed methods or not. R18

The quality issues identified by researchers, both explicitly and implicitly in how they described good mixed methods studies, were very similar to the ones identified through the literature review in Chapter 2 and empirical study of a small number of the HSR studies in Chapter 3. In terms of parts of the study which need to be considered, the interviewees identified the separate qualitative and quantitative components, the linking/integration between methods, and the publications emerging from the study. The part which most researchers referred to as important was that there was some link made between components, that is, integration. The aspects of quality which researchers discussed were also similar to those identified in Chapter 3 for this study - transparency of methods, appropriateness of methods, sophistication of analysis, and expertise of researchers – although these were mentioned by few researchers. Their views on

specific aspects of quality are considered below alongside the findings of the documentary analysis of quality of mixed methods studies in HSR.

5.3 Transparency of methods

There were 15 questions about transparency in the assessment made of the 75 mixed methods studies, 2 about the qualitative component, 2 about the quantitative component, 5 about the mixed methods approach, and 6 about integration (Table 5.1).

5.3.1 Transparency of individual methods

Roles

The roles of both the quantitative and qualitative methods were generally clearly communicated within proposals and reports. Even though a description of the role of each method was usually present, it was sometimes vague. For example, researchers might give the role of a qualitative component as 'gaining stakeholder views' in comparison with a more specific role of interviews with stakeholders 'to consider the policy implications of the findings'. Analysis of free text comments on the Coding Sheet identified how helpful it was when researchers were clear about whether a component was solely in a supporting role to another component or whether it had a stand alone role as well. In 6 studies researchers clearly stated that a qualitative method had a dual purpose of informing a quantitative process through development or elaboration, and of exploring an issue in depth.

Details of methods

Sufficient details were often not given about individual methods. This was particularly the case for the qualitative methods. For example, 42% (19/45) of proposals were assessed as not sufficiently describing qualitative methods, compared with 18% (8/45) for quantitative methods. Analysis of free text comments on the Coding Sheet identified four problems. First, there was sketchy description of the qualitative methods overall (15 proposals and 11 reports). In 3 of these reports there was no description of the qualitative methods at all, only the findings, and in another the qualitative method was described in only one sentence. Second, there were no details about an important aspect of the qualitative research, particularly the analysis (6 proposals and 9 reports). Third, one method was described in detail, usually interviews with a

Table 5.1 Transparency of methods in mixed methods studies

Questions about transparency	Proposal N=45				Report N=47			
	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A
Quantitative methods								
1. Is the role of the quantitative method clear?	98% (44)	0	2% (1)	0	96%(45)	2% (1)	0	2% (1)
2. Is each quantitative method described in sufficient detail?	53% (24)	29% (13)	18% (8)	0	68%(32)	13% (6)	15% (7)	4% (2)
Qualitative methods								
3. Is the role of the qualitative method clear?	87% (39)	0	9% (4)	4% (2)	92%(43)	4% (2)	4% (2)	0
4. Is each qualitative method described in sufficient detail?	24% (11)	29% (13)	42% (19)	4% (2)	38%(18)	28% (13)	30% (14)	2% (1)
Mixing								
5. Is the use of mixed methods justified?	31% (14)	3% (2)	60% (27)	4% (2)	30% (14)	2% (1)	66% (31)	2% (1)
6. Is the rationale for mixing methods given?								
Priority	16% (7)	2% (1)	78% (35)	4% (2)	15% (7)	0	83% (39)	2% (1)
Purpose	42% (19)	0	53% (24)	4% (2)	34% (16)	4% (2)	60% (28)	2% (1)
Sequence	56% (25)	0	40% (18)	4% (2)	49% (23)	0	49% (23)	2% (1)
Stage of integration	24% (11)	0	71% (32)	4% (2)	21% (10)	0	77% (36)	2% (1)
7. Is the rationale clearly communicated?	80% (36)	0	16% (7)	4% (2)	81% (38)	4% (2)	9% (4)	6% (3)

8. Is the way in which the rationale worked in practice discussed?	-	-	-	-	2% (1)	0	94% (44)	4% (2)	
9. Are paradigms discussed?	0	0	96% (43)	4% (2)	2% (1)	0	96% (45)	2% (1)	
Integration									
10. Is the type of integration stated?	11% (5)	0	84% (38)	4% (2)	2% (1)	2% (1)	94% (44)	2% (1)	
11. Is the approach to integration detailed in terms of working together as a team?	7% (3)	0	80% (36)	13% (6)	-	-	-	-	
12. Are the personnel who participate in the integration clearly identified?	9% (4)	0	80% (36)	11% (5)	6% (3)	0	70% (33)	23% (11)	
13. Is there evidence of communication within the team?	-	-	-	-	19% (9)	0	6% (3)	75% (35)	
14. Does the dissemination strategy detail how the mixed methods will be reported in final reports and peer reviewed publications?	0	0	84% (38)	16% (7)	-	-	-	-	
15. Is there clarity about which results have emerged from which methods?	-	-	-	-	87% (41)	2% (1)	6% (3)	4% (2)	

particular group, but a further qualitative method such as observation or focus groups appeared to be 'tagged on' with no description (6 proposals). Fourth, the overall size of the qualitative components was not clear, with a few interviews here and there throughout the study adding up to a sizeable qualitative component of over 100 interviews (10 proposals). However, in 7 proposals and 6 reports the qualitative methods were particularly well described. Two HTA reports, which are easily accessible to the HSR community, are recommended as examples of good practice for describing methods (Donovan et al., 2003a; Kennedy et al., 2003).

To some extent the poor description of qualitative methods is not a surprising finding given the historical dominance of quantitative methodology in HSR and the relative newness of qualitative methodology within HSR. Perhaps more surprising was that in 8 proposals the quantitative methods were sketchily described and in a further 13 proposals aspects of the quantitative methods were not described, in particular the analysis (8) and the numbers involved (5). This was less of an issue for reports but nonetheless there were still problems with sketchy description overall (4), or little or no description of the analysis (5).

One could argue that supplementary methods within a study do not need to be described to the same level of detail as dominant methods. In the free text comments on the Coding Sheet reference was made to the supplementary status of poorly described methods for 5 studies. This highlights the need to consider the status of each method within a study prior to assessing quality. Details about a method may be irrelevant to a supplementary component of a study. However, a judgement may be required about how supplementary a method is within a study. Qualitative components varied from being a few interviews to design a questionnaire, to being a large qualitative component with stand alone status to explore an issue while still having a supplementary role within a study, through to being the dominant component. Where the method was extremely supplementary then the question about details about the method may be irrelevant, but where a method has stand alone status even though it is also supporting the other method, the transparency of method will remain relevant. The fact that it was noted that the supplementary nature of a method accounted for a lack of detail in only 5 studies shows that this did not account fully for poor description of individual methods.

5.3.2 Transparency of mixing

Justification for mixing

In a third of proposals and reports, researchers gave some justification for using mixed methods (Table 5.1). These generally drew on methods complementing each other to answer more questions or give more of the picture, for example to understand processes as well as outcomes, to facilitate a whole systems approach, to give an overview of and details about an innovation. Or they took the approach of specifying the strengths and weaknesses of different methods to answer different questions, for example quantitative methods cannot uncover what is of value to patients, RCTs take inadequate account of context, or qualitative methods uncover issues not accessible to quantitative methods such as less tangible effects and dynamics within a system. Thus there was evidence of acknowledging the deficit of taking a purely quantitative approach in HSR.

Rationale for mixing

Few studies clearly articulated the rationale for mixing methods in terms of the priority of methods, purpose of mixing, the sequence of methods, and the stage at which integration would or did occur (Table 5.1). Researchers were more likely to be explicit about the purpose of mixing and the sequence of mixing than about priority or stage of integration. This lack of transparency around mixing could occur in the context of excellent description of individual methods. In most studies the rationale became clear through the process of reading, that is, the reader could work out the rationale themselves even if it was not clearly stated. In a few studies it was extremely difficult to work out the rationale for mixing methods.

One of the most difficult issues was working out the priority of methods and it was extremely helpful when researchers were explicit about this. It was especially helpful when the dual purpose of a qualitative component was made clear, that is, that it was present both to develop a questionnaire and offer insights about a phenomenon. This level of clarity helped with assessments about the appropriateness of a component, for example it seemed inappropriate to have 40 in-depth interviews as a 'preliminary and brief' aid to develop a questionnaire. A key issue was that it was difficult to assess the priority of methods within studies and it would be helpful if researchers themselves made this explicit.

It is possible that some proposed rationales do not work in practice. For example, a researcher may design a sequential study where a qualitative component is to inform a quantitative

component but in practice this fails to happen due to time constraints within the study. Researchers did not tend to discuss in reports whether rationales had worked in practice.

5.3.3 Transparency of integration

Integration, or the linking between methods, received little attention in proposals, with researchers rarely discussing the type of integration, how it would occur in the context of team working, who would integrate, and plans for the dissemination of integrated data or findings (Table 5.1). This was similar for reports, although researchers tended to be clear about which results had emerged from which methods.

5.3.4 Terminology to aid transparency

When studying the characteristics of mixed methods studies in Chapter 4 it was noted that terminology could be confusing. For example, researchers used the term 'triangulation' without explaining what they meant, or used terms such as 'semi-structured' to describe different approaches within a study. It was also clear here that researchers lacked terminology to describe the mixed methods aspects of their studies. The terminology researchers used to describe their study design, or components within a study, was interesting and included 'mixed methods', 'multimethod', 'policy ethnography', and 'observational qualitative evaluation'. This highlighted the desire of researchers to name the approaches taken within a study to improve communication about intentions and actions.

5.4 Appropriateness

There was little sign that individual methods were used inappropriately, or that methods were mixed inappropriately (Table 5.2). In fact the main challenge was the lack of information about issues such as sampling, analysis, and integration in order to make an assessment about appropriateness. Three issues emerged around appropriateness from the inductive analysis of free text comments on the Coding Sheet. The first emerged mainly at the research proposal stage, when a quantitative approach was proposed within the qualitative component without justification. For example, using random sampling without saying why this was appropriate, analysing qualitative data only by 'quantitising' them, and planning to undertake large numbers of qualitative interviews. The second was a sense that qualitative research was being used when a quantitative approach might have been more appropriate or at least more efficient. For

example, using telephone and face-to-face interviews which were then quantified when interviews could have been used to develop a standardised instrument. The final issue was around the use of grounded theory for the qualitative component. There were examples of it being used for interviews which had the role of informing the development of a questionnaire or gaining stakeholders' views of a service without saying how and why it might work in these contexts. However, grounded theory was not always used inappropriately and there were two examples of excellent use of it, one showing how it could be used in the context of research with an agenda, and the other producing an insightful core category in the context of the evaluation of a health promotion intervention.

There was rarely an issue about the appropriateness of inferences drawn (Table 5.2). In four reports free text comments included concern about the researcher having a strong and unacknowledged agenda which resulted in inferences which were not necessarily grounded in the findings, for example ignoring the poor take-up of an intervention and focusing on the positive views of professionals who used the intervention.

Table 5.2 Appropriateness of methods in mixed methods studies

Appropriateness	Proposal N=45				Report N=47			
	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A
Quantitative methods								
1. Is the method appropriate for addressing the research question?	93% (42)	0	2% (1)	4% (2)	98% (46)	0	0	2% (1)
2. Is the approach to sampling and analysis appropriate for its purpose?	67% (30)	4% (2)	4% (2)	24% (11)	70% (33)	9% (4)	6% (3)	15% (7)
Qualitative methods								
3. Is the method appropriate for addressing the research question?	87% (39)	7% (3)	2% (1)	4% (2)	91% (43)	2% (1)	2% (1)	4% (2)
4. Is the approach to sampling and analysis appropriate for its purpose?	42% (19)	4% (2)	9% (4)	40% (18)	53% (25)	9% (4)	4% (2)	34% (16)
Mixing								
5. Is the rationale appropriate for addressing the research questions?	87% (39)	2% (1)	2% (1)	9% (4)	87% (41)	0	2% (1)	11% (5)
Integration								
6. Is the type of integration appropriate to the design?	16% (7)	0	0	84% (38)	34% (16)	0	2% (1)	64% (30)
7. Did appropriate members of the team participate in integration	-	-	-	-	0	0	2% (1)	98% (46)
8. Are inferences appropriate?	-	-	-	-	83% (39)	4% (2)	9% (4)	4% (2)

5.5 Validity

5.5.1 Individual methods

Validity of the individual methods was assessed by considering the attention researchers gave to issues such as confounding and bias for quantitative methods, and issues such as reflexivity and attention to negative cases for qualitative methods. Whereas two thirds of proposals discussed confounding or bias for quantitative methods, only a quarter paid attention to validity issues for qualitative methods (Table 5.3). Researchers took the validity of qualitative methods seriously in some proposals, for example paying attention to the gender of the interviewer, deviant cases, peer review of transcripts, collaboration with an expert for analysis; and in one proposal there was a whole section entitled 'validity of qualitative methods'.

Concerns were identified from the open comments on the Coding Sheet about the validity of both quantitative and qualitative components. For the quantitative components these included collecting data in different ways for different arms of a RCT, incorrect analysis or no analysis, lack of an 'intention to treat' analysis, and not taking the sampling technique into consideration when drawing inferences about a population. For the qualitative components, these included the researcher having a very strong agenda which did not seem to be adequately supported by the data, and having health professionals and patients in the same focus group without reflection about the problems this might have caused.

5.5.2 Rationale

The validity of a rationale for mixing is an important consideration because, for example, there may be a need for independent data collection and analysis between the qualitative and quantitative components undertaken with the purpose of confirmation. Researchers rarely explicitly discussed issues of rigour for the mixed methods rationale employed and in many cases there was simply not enough information about the rationale in the first place (see Table 5.1), making this issue difficult to assess. Triangulation was used to indicate validity in two studies without discussing the problems of this approach (see Chapter 2).

There were examples of attention paid to the rigour of mixing in studies involving qualitative methods with RCTs. A team of researchers proposed that qualitative findings would not be shared with quantitative colleagues to minimise the possibility of contamination of the trial, and

in another two studies the qualitative research was undertaken with people not participating in the trial in order not to contaminate the trial. The extent to which this attention to blinding and contamination is necessary needs debate but at least there some evidence that researchers were giving consideration to this issue.

5.5.3 Integration

Similarly, a mixed methods approach could result in damage to the integrity of an individual method, or the integrity could be compromised, during any integration. This rarely occurred (Table 5.3) but mainly because there was little integration in studies in the first place (see Table 5.1). There were some possible incidences of this, for example a Delphi exercise was restricted to fit in with the qualitative fieldwork, and an author of one report expressed concerns that the topic guide for the interviews was much more focused than they would have preferred due to the need to interact with the quantitative component of the study. An interesting example in the set of 75 studies was a report where two poorly undertaken methods were extremely well integrated, raising the issue that integration alone is not necessarily an indicator of a high quality mixed methods study.

5.5.4 Inferences

Researchers tended to be clear about the methods upon which inferences were based (Section 5.3.3), and inferences tended to be appropriate (Section 5.4). However, for a fifth of studies there was an issue about whether inferences were based on the findings of all the methods. The imbalance was as likely to be towards qualitative findings as it was towards quantitative findings. When the balance was towards qualitative findings this was due to the failure of the quantitative parts of the study, the intervention not working, or the lead author not seeming to know how to deal with quantitative data. When the balance was towards quantitative findings, the qualitative research was ignored completely in the discussion of the report or received merely a glancing mention.

Table 5.3 Validity in mixed methods studies

Validity	Proposal N=45				Report N=47			
	YES	YES, BUT	NO	N/A	YES	YES, BUT	NO	N/A
Quantitative methods								
1. Issues of validity addressed for the method.	64% (28)	0	30% (13)	7% (3)	49% (23)	4% (2)	40% (19)	6% (3)
2. Rigour of the method has been compromised.	7% (3)	0	91% (41)	2% (1)	9% (4)	4% (2)	83% (39)	4% (2)
Qualitative methods								
3. Issues of validity addressed for the method.	24% (11)	0	64% (29)	11% (5)	30% (14)	2% (1)	57% (27)	11% (5)
4. Rigour of the method has been compromised.	2% (1)	0	91% (41)	7% (3)	6% (3)	2% (1)	81% (38)	11% (5)
Mixed								
5. Rigour of the mixed methods design has been considered.	7% (3)	0	93% (42)	0	-	-	-	-
6. Rigour adhered to for the rationale chosen	-	-	-	-	21% (10)	0	0	79 (37)
Integration								
7. Rigour compromised by the process of integration	-	-	-	-	4% (2)	0	0	96% (45)
8. Are the results of all the methods considered sufficiently in the interpretation?					66% (31)	6% (3)	19% (9)	9% (4)

5.6 Expertise

Expertise on research teams proved to be extremely difficult to assess. When assessing research proposals, it helped when there were CVs attached or researchers specified which applicant would take a lead on different aspects of a study and why. However, even the presence of CVs sometimes did not help due to the paucity of information within them. Unfortunately, information about expertise was not available for the quantitative methods for a quarter of studies and for the qualitative methods for a third of studies (Table 5.4). There were only a few proposals for which there was obvious concern about expertise of applicants, either around lack of statistical expertise or qualitative expertise. Some sets of applicants specified that one researcher would be employed to do both the qualitative and quantitative research without specifying the expertise required, whereas others specifically mentioned the need to split a full time job between two researchers with specific skills, or discussed the need to employ a skilled or senior qualitative researcher for the qualitative component.

In the reports, it was even more difficult to identify the expertise of authors because details usually included only a list of names. What was apparent, however, was that the qualitative parts of studies could differ greatly in their sophistication (see Section 5.7). There were examples of both simplistic analyses and sophisticated analyses emerging from studies with authors with high levels of expertise. That is, experts did not necessarily produce sophisticated analyses. It was also difficult to judge the expertise of contract researchers. However, in one report the limited expertise of the contracted researcher, who was first author, was evident. Yet in another, the contracted researcher appeared to have saved a very poor proposal and produced an excellent report of a mixed methods study.

Table 5.4 Expertise in mixed methods studies

Expertise	Proposal N=45				Report N=47			
	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A
Quantitative methods								
1. Expertise amongst applicants to supervise method	67% (30)	2% (1)	7% (3)	24% (11)				
2. Expertise on team to undertake method	60% (27)	0	2% (1)	24% (11)				
3. Expertise amongst authors					30% (14)	0	0	70% (33)
Qualitative methods								
4. Expertise amongst applicants to supervise method	56% (25)	2% (1)	11% (5)	31% (14)				
5. Expertise on team to undertake method	44% (20)	9% (4)	7% (3)	40% (18)				
6. Expertise amongst authors					32% (15)	4% (2)	0	64% (30)

5.7 Sophistication

A concern was expressed in the literature review in Chapter 2 that mixed methods studies may result in the use of underdeveloped methods and a simplistic analysis of one or both data sets. There was little evidence of a lack of full development of methods (Table 5.5). The main problem with determining the intended sophistication of analyses in research proposals was the lack of information (see Table 5.1). There was more information available in research reports and here there was an issue with the sophistication of a quarter of quantitative analyses and a fifth of qualitative analyses.

Open comments on the Coding Sheet identified 12 studies where the reported quantitative results seemed simplistic, sometimes only presenting descriptive statistics with no statistical tests and in two cases using an experimental design which was then ignored in the analysis. In a further 3 studies, the multilevel aspect of the data was ignored. Similarly, in 9 studies the reported qualitative findings remained at a descriptive level, or reported findings in a quantitative manner, or failed to distinguish between data collected using different methods such as focus groups and interviews.

There is an issue about how sophisticated an analysis needs to be. This is related to the role and priority of each method, as discussed earlier when considering transparency of methods in Section 5.3. Where a method takes a supplementary role with the purpose of development, a simple analysis may be appropriate. The open comments on the Coding Sheet identified 4 studies where the simple qualitative analyses suited the context of the study - a 'quick and dirty' two month project, or where the status of the interviews was to shape the research focus of the study. This highlights the need for researchers to be explicit about the level of sophistication needed for a particular method. If a survey is undertaken with the sole aim of identifying a sample for the qualitative component and offering some context for those interviews then a sophisticated analysis would not be expected. However, if the aim is to address some of the study objectives then expectations of the analysis would be higher. Two research groups were clear in their proposals about the level of qualitative analysis required in their studies. In one study, two sets of interviews were undertaken, with one set of interviews not transcribed because their role was to describe rather than to understand an issue. In another study the role of the interviews was to identify what key organisations were thinking about an issue, that is, simply to describe views. The researchers were clear about their intentions to undertake a simple descriptive analysis. This highlights the need for researchers to be clear about the level of analysis needed for their study and to state that level in their research proposals so they can

show that they have the resources and expertise to deliver. This would ensure that funding bodies and reviewers understand the level of sophistication required in any analysis.

The sophistication of qualitative research in HSR was also a cause of concern amongst the interviewees. There was a concern that, if qualitative research was always in a subservient role in a mixed methods study, then it would never be undertaken to a quality required to produce a sophisticated analysis. A second concern was the tendency for qualitative research in HSR in general to use simple descriptive analysis rather than engage with sociological or psychological theory for a more sophisticated analysis. In contrast, there was also an expressed need for different levels of qualitative research within HSR. Interviewees felt that sometimes it suited the purpose of a study to undertake unstructured data collection with simple content analysis. However sometimes this could lead to problems around publication of results because this approach lacked credibility.

There is a lot of history of those sorts of studies, [...] tacking on a bit of qualitative research where it's not really wanted, and wasn't given enough chance to be done well enough, and then it doesn't show anything, and that discredits it. R16

We used qualitative methods in inverted commas, in that you know we interviewed people. I had a group, not really a focus group, but you know sort of worked with the questionnaires in groups. But really didn't use any formal qualitative analysis, so we sort of used the approach of working with people, interviewing them, working in groups, but the actual formal methodology, theoretical underpinnings were missing, and that was something I had to work on in [this project]. R6

Table 5.5 Sophistication of methods in mixed methods studies

Sophistication	Proposal N=45				Report N=47			
	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A
Quantitative methods								
1. Is each method sufficiently developed for its purpose?	84% (38)	0	7% (3)	9% (4)	83% (39)	0	4% (2)	13% (6)
2. Is the intended analysis sufficiently sophisticated?	56% (25)	4% (2)	2% (1)	38% (17)	51% (24)	15% (7)	25% (12)	9% (4)
Qualitative methods								
3. Is each method sufficiently developed for its purpose?	64% (29)	0	9% (4)	27% (12)	77% (29)	2% (1)	9% (4)	13% (6)
4. Is the intended analysis sufficiently sophisticated?	40% (18)	4% (2)	7% (3)	49% (22)	51% (24)	13% (6)	19% (9)	17% (8)

5.8 Feasibility

5.8.1 Individual methods

In most research proposals the quantitative methods appeared to be feasible in the time and money allocated (Table 5.6). However, there was not enough detail about methods to determine the feasibility of qualitative methods in a third of studies, for example no indication of numbers of interviews to be undertaken or no sign of the qualitative research in the study timetable. There were concerns about the feasibility of the qualitative research in another third of proposals. The open comments in the Coding Sheet identified 14 proposals where a large number of qualitative interviews were planned in a short time scale, for example 40 interviews in four months without specifying the depth of interview and analysis. In 9 of these studies the report was available and in 4 cases considerably fewer interviews were undertaken than planned, for example 49 rather than 60 interviews in a two year study with a large variety of methods, and 100 interviews with a three month analysis period reduced to 29 interviews in practice. The reduction in numbers felt more appropriate than the larger numbers planned. However, concerns highlighted about the feasibility of the qualitative research when assessing the research proposals did not necessarily translate into reductions or losses in the final study.

Non-completion of a whole component of a study was rare within this group of HSR studies, with close to 90% of studies having both the qualitative and quantitative components completed (Table 5.6). However, in a fifth of reports, a quantitative method or a qualitative method was not executed as planned. This tended to be due to a range of problems in the field, for example, controls were not used as planned in the quantitative part of a study because all health authorities were offering the service under evaluation, or health professionals refused invitations to be involved in the study.

5.8.2 Rationale

There was rarely a problem with the feasibility of the mixed methods rationale in practice. Again, there was a lack of information to determine whether there was enough time allocated within the proposal for integration of methods, but concerns about integration mainly centred around whether enough time had been left for the qualitative research to be undertaken where it was being used to inform the development of a survey questionnaire.

Table 5.6 Feasibility of mixed methods studies

Feasibility	Proposal N=45				Report N=47			
	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A	YES	YES, BUT MORE POSSIBLE	NO	NOT ENOUGH INFO or N/A
Quantitative methods								
1. Is the method feasible?	82% (37)	2% (1)	4% (2)	11% (5)	-	-	-	-
2. Were some methods planned but not executed?	-	-	-	-	19% (9)	0	45% (21)	36% (17)
Qualitative methods								
3. Is the method feasible?	38% (17)	20% (9)	13% (6)	29% (13)	-	-	-	-
4. Were some methods planned but not executed?	-	-	-	-	21% (10)	2% (1)	38% (18)	38% (18)
Mixed								
5. Is the mixed methods design feasible?	51% (23)	0	7% (3)	42% (19)	-	-	-	-
6. Did the rationale work in practice?	-	-	-	-	85% (40)	0	2% (1)	13% (6)
Integration								
7. Has enough time been allocated for integration?	2% (1)	0	13% (6)	85% (38)	-	-	-	-
Success								
8. Have both qualitative and quantitative parts been completed?	-	-	-	-	87% (41)	6% (3)	2% (1)	4% (2)

5.9 'Yield'

5.9.1 Yield within proposals and reports

Studies were assessed to identify whether the potential for mixing methods had been fully exploited. A fifth of reports were assessed as yielding their potential, and about half of proposals and reports were assessed as yielding at least some of the potential of mixing methods (Table 5.7). A number of themes emerged from the inductive analysis of open comments on the Coding Sheet about the ways in which the yield from mixed methods studies might have been increased.

Table 5.7 Yield from mixed methods studies

Have potential approaches to mixing methods been fully exploited?	Proposal		Report	
	%	N=45	%	N=47
YES	13%	(6)	21%	(10)
YES, BUT MORE POSSIBLE	31%	(14)	28%	(13)
NO	56%	(25)	51%	(24)

Taking individual methods seriously at the proposal stage

In 6 proposals the role of the qualitative component was unclear and appeared to be so 'tacked on' to the study that it seemed almost worthless. In two of these studies the qualitative component was practically invisible, and in another the qualitative component did not appear in the 'general' parts of the proposal, such as the timetable. In another proposal, different parts of the proposal were inconsistent, and it appeared that the qualitative researchers were doing a different study from the one outlined by the quantitative researchers. This was not unique to the qualitative component. When requesting documentation about studies, one researcher questioned whether theirs was a mixed methods study, acknowledging its mixed methods status only when the quantitative component was pointed out to them. Without clarity and detail at the proposal stage, it is likely that a component may survive and be undertaken well by accident rather than design.

Getting the timing of methods right

As detailed earlier in Section 5.3 on transparency, researchers did not always pay explicit attention to the sequencing of the qualitative and quantitative components in their research proposals. For example, it would be implicit that interviews would be undertaken alongside an RCT when a sequential approach, such as using the interviews to shape the intervention in the early stages of the research or to explore issues emerging from the trial at a later stage, might yield more. Where there was a strong sequential use of methods in a study, the roles of the different components, and integration between methods, tended to be clear. For example, where qualitative research was undertaken prior to a quantitative component to develop the quantitative instrument, or after the quantitative component to expand upon the quantitative findings by following up people who had and had not benefited from the intervention. In one study the time frame was so short that this sequential approach would have been impossible and it is likely that the use of a sequential approach to methods might be limited by a need to keep the length of projects to a minimum. However, there were 6 studies where a more explicit sequential approach at the design stage might have yielded better integration of methods within a study.

Studying qualitative and quantitative data within cases

In some studies, both quantitative and qualitative data were available for a subset of cases. For example, some individuals who had completed a questionnaire were also interviewed, or quantitative data were collected about outcomes for a set of organisations along with qualitative data about the key features of those organisations. However, there was a tendency to analyse and report the quantitative data separately from the analysis and reporting of the qualitative data. Rarely were these quantitative and qualitative data brought together on each case, and in 18 proposals and 16 reports the opportunity to do so was not taken. The potential benefits of looking at the two types of data *within* each case, and their relationship with each other *across* cases, included:

Contextual information to aid interpretation (3 studies)

In one study, views emerging from a survey and focus groups differed. This was attributed to the strength of the qualitative approach in uncovering areas of concern and dissatisfaction with health services. The implicit assumption was that focus group participants were representative of survey respondents. Yet focus group participants may simply have been people who felt they had something to say and therefore had more concerns than others. Survey information was available for all the focus group participants and this could have been used to understand who

had participated in the focus groups, thus clarifying the relationship between the survey findings and the focus group findings, and possibly leading to a different interpretation of findings overall.

Understanding variation (5 studies)

In a number of studies the quantitative data showed variation in the performance or utilisation of different organisations or health professionals. Qualitative methods of observation and interview were also used on some of these cases to describe the organisations or obtain the views of the health professionals. These two data sets tended to be analysed separately rather than also bringing them together on a case basis to see if the qualitative findings might help to understand or explain some of the variation in the quantitative data set. For example, performance data were available for a group of health professionals using a new intervention and variation was noted. The views of these health professionals had been sought about the intervention within a qualitative interview and it was obvious that they all used the intervention in different ways. These two data sets could have been put together to see if particular ways of using the intervention resulted in better performance. In another example, a mixture of qualitative and quantitative methods was used to study the utilisation of a new service and the views of doctors, nurses and patients obtained. There were a number of different models of service set-up but the data were reported by utilisation data overall, users' views overall, nurses' views overall, and then GPs' views overall. Different service set-ups and the views of health professionals working within them may have contributed to differences in the utilisation of, and satisfaction with, this service. Some researchers have attempted to bring qualitative and quantitative data together - see Box 5.1 for an example of good practice.

Engaging with the multi-level nature of data (9 studies)

A number of studies involved a multi-level analysis, in particular cluster RCTs. In some of these studies, qualitative data were collected at a cluster or group level, for example about general practices, hospitals, or health professionals. The qualitative research could have been used to develop a variable at the group level for use in the quantitative multi-level analysis. This was relevant outside the context of cluster trials when multi-level analyses were used in the quantitative component of a study. It was also relevant outside the context of quantitative multi-level analysis when the way in which the research was undertaken lent itself to exploiting further levels in the data. For example, focus groups about general practice services were recruited at each general practice and may have offered insights about the variation between general practices as well as general practice overall.

There is an obvious problem with this approach to integration of qualitative and quantitative research – that of small numbers of cases where both qualitative and quantitative data are

available. In the example given in Box 5.1 there were only seven cases and the 'analysis' of differences between types of case was informal and non-statistical. It is likely that the status of this approach is hypothesis-generating rather than hypothesis-testing. This cautionary approach to integrating qualitative and quantitative data has been taken in the context of a systematic review of qualitative and quantitative studies where the researchers were explicit about the hypothesis generating status of the integration (Thomas et al., 2004). In some studies there may be enough cases to undertake a quantitative analysis, particularly in the context of multilevel analyses.

Box 5.1 A good example of bringing qualitative and quantitative data together within and across cases

Seven case studies of GP cooperatives were undertaken to explore their organisation and impact (Hallam & Henthorne, 1999). A key informant and GPs at each service were interviewed to describe the service and gain perceptions of its impact on other services. Quantitative data were collected on the numbers of contacts with each service, and a survey was undertaken of patient satisfaction. Rather than only analysing the two data sets separately, quantitative data were analysed across the seven case studies, showing different levels of patient satisfaction for the services. Services with dedicated receptionists were shown "broadly" to have higher patient satisfaction (p36). The presence and absence of dedicated receptionists was a simple descriptive issue gleaned from the qualitative interviews. Nevertheless, it identified a potentially important influence on patient satisfaction. One can imagine that a less descriptive issue, requiring more depth analysis of the qualitative data, such as commitment of the GPs to the new service model, could also have been employed to understand variation in the utilisation of, and patient satisfaction with, services.

Seeing cases as well as variables

As discussed above, researchers rarely took the opportunity to put qualitative and quantitative data together on individual cases to look within each case and then across the cases. This seemed to be related to a tendency to see and value separate data sets, and variable-based analyses, over and above cases. In 6 study reports there was a missed opportunity of taking a case focus within a single data set. In 4 of these, case studies had been set up but the case study aspect of the project was completely ignored. Instead of analysing by case, data from all the case studies were combined and analysed as one data set only, for example reporting health professionals' views from all the case studies together. Some researchers kept a strong case focus in their study, which appeared to benefit understanding (See Box 5.2 for an example of good practice).

Box 5.2 A good example of a taking a case focus

A mixed methods study included case studies of six Trusts to look at the relationship between culture and performance (Mannion et al., 2005). The case focus was used to identify insights about culture *within* individual case studies, and to identify relationships between performance and aspects of culture *across* the six cases. A large quantitative study was then undertaken to see if patterns found across the six case studies were repeated nationally.

Exploiting the individual methods

The issue of exploiting individual methods has been covered to some extent when discussing sophistication of methods in Section 5.7. In 3 reports it seemed that more could have been done with the quantitative component. In one of these studies the strength of a quantitative method in collecting representative standardised views was ignored; in another the data were grossly under analysed; and in another there was a failure to collect much of the quantitative data proposed.

Much more commonly, in 6 proposals and 10 reports, more could have been done with the qualitative component of the study. There were two concerns. One centred around the status of the qualitative method and a lack of clarity around whether it was in the study merely to support and inform a quantitative method or whether it was also there to offer insights and contribute fully to publications in its own right. It is important to accept that a method may only have a supportive role within a study by being present only to develop another method. However, qualitative research can address aspects of phenomena which quantitative research cannot. In some cases it seemed when a qualitative method did not have a stand alone role as well as a supportive one that an opportunity had been lost. Perhaps the main issue here was around transparency, with the need for researchers to be clear about what each component would deliver because this was likely to affect readers', funders' and reviewers' expectations of funding, the timetable, costs, and quality assessment. The second issue centred around whether the qualitative component was being put to best use. For example, in a feasibility study for an RCT it could have been used to determine what the best outcomes were, and in an outcome-measure development study it could have been used to aid the factor analysis rather than simply generate items. In some of the reports it was hard to determine what the qualitative component offered over and above the quantitative component.

Exploitation of the qualitative component was particularly relevant to the five studies where the focus was instrument development. In one study a large number of qualitative interviews were undertaken with a poorly researched patient group; they were used to identify items for an instrument but were not analysed for insights about the patient group. Analysis of these interviews could have been used to explore aspects of being a member of that patient group, devise a conceptual framework for the quantitative factor analysis, or check out the appropriateness of reducing items in the factor analysis. This sense of missed opportunity was apparent to varying degrees in other instrument development studies and contrasted with one study which exploited the qualitative component to a much larger extent (see Box 5.3).

Box 5.3 Good example of exploiting methods in instrument development

Six focus groups and 13 interviews were undertaken to explore users' views of the primary secondary care interface (Baker et al., 1999; Preston et al., 1999). This qualitative component contributed additional insights about patient satisfaction in this area and resulted in a published article. Then rather than simply use these interviews to identify a list of items for quantitative testing, a thematic structure was devised for the factor analysis in the quantitative study. The researchers also moved between the qualitative and quantitative data sets when making decisions about which items to group together and to remove within the factor analysis rather than rely solely on the statistical properties of the quantitative data set.

There were examples of fully exploiting the qualitative component of a study, as detailed in Box 5.3 above. One could argue that the example above illustrates merely that the processes were more integrated but says little about whether the outcome – the resulting instrument – was better than one produced in a less integrated way. Two of the studies included in the interviews in Chapter 6 were instrument development studies. One was included because it was assessed as producing good yield and the other because it was assessed as producing poor yield from a mixed methods study; both studies were executed to an excellent standard in terms of research in general. The interviewee in the first study described being proud of the instrument produced and the other expressed disappointment and frustration at not exploiting the qualitative component of their study.

There were also examples of some very simple uses of qualitative data which proved to be powerful. For example, in a report of an evaluation of a new health service, the qualitative research was used to offer case illustrations of the service and its users. This was the only place

in the report where the reader got a real sense of how the service worked and it gave a real life context in which to consider the various findings of the study (www.phc.bris.ac.uk/phcdb/pubpdf/pubs/257.pdf accessed 4/5/06). There were also examples of innovative use of qualitative research specific to HSR. In particular, observation and interview were used within a feasibility study to consider recruitment and improve the methodology of an RCT (Donovan et al., 2002) - the qualitative component was taken seriously and changes to recruitment practice within the RCT were made.

Allowing the analysis of one method to affect the analysis of another method

In 6 reports the analysis of one set of data could have affected how another data set was analysed, yet both were analysed separately without reference to the other. For example, in one study a typology produced within a survey about different approaches to health promotion could have been applied to the focus group analysis. In another, socio-economic status was identified as extremely important in the quantitative analysis and could have been considered in the qualitative analysis. Even at the proposal stage there was a sense that issues emerging from one data set could affect the analysis of the other, but the possibility of this was not mentioned (4 proposals).

Using the sampling information within the qualitative analysis

A common approach to mixing methods was to use the quantitative component as a sampling frame for the qualitative component, for example sampling case studies from a survey, sampling patients whose health improved or not in a RCT for in depth interview, or sampling for interview those who received an intervention or not. In 5 reports where this was used, this 'extra information' was not included in the qualitative analysis. For example, all the interviews were analysed en masse without consideration that some interviewees received benefit from an intervention and some did not. Nor did researchers then consider the findings from the qualitative component to help them to make inferences about the whole sample or at least reflect on what the findings meant for the quantitative sample.

Making use of sophisticated triangulation or 'crystallisation'

As discussed in Chapter 2, the term 'triangulation' can be used both to describe confirmation between findings from different methods and to describe an approach which requires the researcher to look for convergence, divergence, and discrepancy between findings from different methods. This latter approach is better described as crystallisation. There were 21 reports where researchers made excellent attempts to crystallise the findings emerging from all components of

the study, either by presenting their qualitative and quantitative results together in the Results Section under themes and objectives addressed, rather than separate chapters for each set of findings, or by drawing together inferences from the different components under themes in the Discussion Section. However, in 12 reports researchers made minimal or no use of this approach when it might have yielded further insights about the issue under study. They produced separate reports for the qualitative and quantitative components, reported the qualitative and quantitative components separately in the Discussion, or presented the qualitative and quantitative findings together without explicitly considering how they related to each other.

Results synthesis was rarely explicitly discussed in proposals. In one proposal researchers outlined the results synthesis they would undertake, whereas in another proposal researchers wrote a paragraph about the synthesis of the RCT and economic evaluation findings but did not give attention to synthesis of the qualitative and quantitative findings. Interestingly in one report, researchers included a 'results synthesis' chapter.

Investigating apparent discrepancy

When comparing data or findings from different methods, there may be some discrepancy or apparent discrepancy. In one proposal researchers stated that they would explore discrepancies between findings from different methods and in 6 reports researchers were explicit about the possibility of discrepant results emerging from their studies. Where discrepancy was found in one report, the researchers privileged the qualitative finding and recoded a quantitative variable based on this finding. However, in another study attention was not paid to the different sampling for the qualitative and quantitative data sets as a possible explanation for the discrepancy. In a further 6 reports attention could have been given to the possibility of discrepant findings and in two of these the focus on convergence may have been a barrier to consideration of discrepancy.

5.9.2 Types of publications as yield

The types of publications emerging from mixed methods studies were assessed to see if researchers exploited the mixed methods aspect of their studies by publishing from both components of the study and being explicit about the extra insights gained from the mixed methods aspect of the study. It was possible to assess the types of peer-reviewed publications emerging from the studies in the documentary analysis for 49 studies where there was at least a two-year period between the end of the study and this assessment. There was a median time period of 5 years for publications to emerge, with a minimum of 2 years and a maximum of 8

years. There were no publications for 18% (9/49) of studies, a median of 2 publications, and a maximum of 8 publications per study. These publications included published protocols and systematic reviews as well as publications based on primary research, which are the focus of this thesis.

When articles based on primary research only were counted, a quarter of studies only published one component, usually the quantitative component (Table 5.8). A further fifth of studies published both components separately. That is, about half of the mixed methods studies appeared to be mono-method studies by the publication stage. Only one third of studies produced 'mixed methods' publications, that is, a single publication which included details of both the qualitative and quantitative data collection and analyses. HTA reports were included here because they are peer-reviewed and electronically accessible. When these were removed from the analysis, so that the focus was on peer-reviewed journal articles, less than a fifth of mixed methods studies produced mixed methods articles (Table 5.8).

Table 5.8 Primary research publications produced from mixed methods studies

	Including HTA reports		Excluding HTA reports	
	%	(n)	%	(n)
No primary research publication	20%	(10)	24%	(12)
Qualitative only	8%	(4)	8%	(4)
Quantitative only	20%	(10)	26%	(13)
Both qualitative and quantitative	18%	(9)	24%	(12)
Mixed	33%	(16)	16%	(8)
Total	100%	(49)	100%	(49)

At this stage one could draw the conclusion that the 'best yield' from a mixed methods study is a mixed methods paper because it explicitly documents the extra insights gained from combining methods, and that less than a fifth of studies produced this 'best yield' if peer-reviewed journal articles only are considered. However, mixed methods papers did not necessarily indicate a good quality yield. Within the publications there were mixed methods papers which looked cobbled together from two data sets, or which reported the different data sets side by side without explicit reference to the links between them. That is, no extra insights were available to the reader from these papers. Conversely, some papers based on one component only paid ample attention to linking the different data sets from the wider study.

Focusing on studies with peer-reviewed journal articles, in 14% (5/37) researchers did not refer to the fact that a paper was part of a wider study (Table 5.9). In a third of studies with peer-reviewed journal articles (12/37) researchers described the full study and its components and reported one aspect of the study without further reference to the other parts. However, explicit links were made between the data and findings from different components of a study within some of the papers reporting a single component. When papers were mixed, the links between the two components were more likely to be explicit than not. Nonetheless there were examples of the two methods presented separately within a single publication. In total, 54% (20/37) of studies producing peer-reviewed journal articles made some attempt to integrate findings within one paper.

Table 5.9 Links between methods in primary research publications emerging from mixed methods studies

	Including HTA reports		Excluding HTA reports	
	%	(n)	%	(n)
Single component published				
no reference made	10%	(4)	14%	(5)
reference made	21%	(8)	24%	(9)
explicit links made	5%	(2)	8%	(3)
Both components published separately				
no reference made	0		0	
reference made	8%	(3)	8%	(3)
explicit links made	15%	(6)	24%	(9)
Mixed methods publication				
separate report	15%	(6)	5%	(2)
explicit links made	26%	(10)	16%	(6)
Total*	100%	(39)	100%	(37)

*totals different from Table 5.8 because only studies with primary research publications are included here

Examples of good practice in peer-reviewed publications included researchers making explicit links between components of a study within a single method or mixed method publication (see Box 5.4). Another possible model of good practice emerged from one study where the lead author produced an 'overview' paper, drawing on the multiple separate publications from the study. Unfortunately, scant attention was given to the qualitative findings because they were unpublished in a peer-reviewed journal. This model could have been applied to at least one other study with multiple separate publications. The approach is akin to bringing a number of jigsaw pieces together and building as complete a picture as possible with them about a service under evaluation or an issue under study.

Box 5.4 Examples of good practice in publications

1. Separate papers with explicit integration

An example of separate papers producing excellent links between data sets is a paper on qualitative research undertaken alongside an RCT (Rogers et al., 2004). In the paper, the RCT to which the study is linked is outlined and the main findings reported within a box. This means that as the findings from the qualitative research are reported, reference can be made back to how they relate to the findings from the quantitative study. In practice, the link made between the findings seemed like a small one, where the quantitative research reported an overall preference for the new service and the qualitative research explained why those who did not prefer the new service had a problem with it. However, the link was significant, with the quantitative research placing the qualitative finding in context, and the qualitative research elaborating on the quantitative finding. Drawing on the jigsaw analogy used earlier, the reader was offered two connected pieces of a jigsaw puzzle, rather than having to find the two separate pieces in different journals and make the connection themselves.

A further good example of making links within a paper based on one component only was a feasibility study for a trial of prostate testing for cancer and treatment. Donovan produced a mixed methods paper showing clearly the effect of the qualitative findings on the RCT methodology (Donovan et al., 2002), but also produced a quantitative paper which in the discussion section brings in the findings from different parts of the wider study (Donovan et al., 2003b). In this latter paper, the researchers are able to explain the high recruitment levels reported in their paper by giving the findings of the qualitative research which was published separately (Mills et al., 2003). This approach requires sequential publication of different parts of the study, which may not be easy to do given the different lag times for journals and the difficulty of getting articles accepted. Nonetheless it can be a powerful way of making links between data sets.

2. Mixed methods paper

Hartney and colleagues offer an example of bringing qualitative and quantitative data collection and analysis together in the same paper. Standardised tools were completed by a cohort of 500 untreated heavy drinkers and two sub-samples of 25 participants each were sampled from the cohort to explore dependence and readiness to change (Hartney et al., 2003). The meaning of an item on a standardised questionnaire was explored in the interviews. The quantitative analysis showed that one model of readiness to change did not fit the data and the qualitative interviews revealed that readiness to change in this group was more akin to another theoretical model.

5.9.3 Yield by type of research

Researchers in HSR may be exploiting the potential of mixed methods in some types of research and not others (Table 5.10). There was no evidence that yield differed by type of research in either proposals ($p=0.91$) or reports ($p=0.39$), although the power to detect differences was low.

Table 5.10 Association between yield and type of research

	Evaluation	RCT	Survey and fieldwork	Other
PROPOSAL YIELD				
Yes/Yes but more possible	42% (5)	50% (6)	47% (7)	33% (2)
No /Not applicable	58% (7)	50% (6)	53% (8)	67% (4)
	100% (12)	100% (12)	100% (15)	100% (6)
REPORT YIELD				
Yes/Yes but more possible	31% (4)	62% (5)	58% (11)	43% (3)
No/ Not applicable	69% (9)	38% (3)	42% (8)	57% (4)
	100% (13)	100% (8)	100% (19)	100% (7)

5.9.4 Yield for different purposes and processes

Some types of integration and publications may be relevant to some purposes and processes of mixing only. When studying yield in the proposals and reports (Section 5.9.1), consideration was given implicitly to the yield relevant to the purpose and process of mixing in each study. A higher yield could have been achieved in studies regardless of the purposes and processes of mixing (Table 5.11).

The stage of the study at which integration took place was considered for different purposes and processes (Table 5.11). Integration at the interpretation stage of a study (crystallisation) was relevant to the purposes of complementarity, expansion, and confirmation in order to display 'the bigger picture' or increased validity. However, where the purpose was development, integration at this stage was not necessarily relevant. Therefore in Table 5.11 it appears that there were only a few examples of a problematic lack of integration at the interpretation stage of a study. In these few cases separate reports were written for each component, or components were placed side by side in a discussion without any explicit links made between them. This suggests that there were few problems with crystallisation, and this appears to contradict the findings in Section 5.9.1. However, the issue was rarely a total lack of crystallisation but rather the *extent* of any crystallisation which was attempted. In many reports where crystallisation was relevant, considerably more could have been done to link findings from the different components.

Different types of publications may be more important for some purposes and processes than others. Mixed methods articles and articles from both components which make explicit links to each other were important for the purposes of complementarity, expansion, and confirmation, again to display 'the bigger picture' or increased validity. However they were not necessarily relevant to the purpose of development. One could also argue that where there was equal dominance of methods then publication from both components would be expected, but where one method dominated then a single publication might be appropriate as long as it explicitly acknowledged the contribution of the more supplementary method. Yet the range of different types of publications emerged from all purposes and processes (Table 5.11).

Table 5.11 Yield for difference purposes and processes (completed studies only)

	PURPOSE					PRIORITY	
	Complementarity	Expansion	Confirmation	Development	Dominant method	Equal dominance method	
YIELD							
Yes/Yes but more possible	53% (10)	33% (7)	33% (1)	59% (10)	48% (15)	50% (8)	
No /Not applicable	47% (9)	67% (14)	67% (2)	41% (7)	52% (16)	50% (8)	
	100% (19)	100% (21)	100% (3)	100% (17)	100% (31)	100% (16)	
STAGE OF INTEGRATION							
Design	10% (2)	14% (3)	0%	47% (8)	23% (7)	12% (2)	
Sampling	68% (13)	18% (4)	100% (3)	53% (9)	42% (13)	35% (6)	
Analysis	21% (4)	14% (3)	33% (1)	12% (2)	16% (5)	18% (3)	
Interpretation	95% (18)	91% (20)	100% (3)	53% (9)	81% (25)	82% (14)	
	100% (19)	100% (22)	100% (3)	100% (17)	100% (31)	100% (17)	
PUBLICATIONS							
Single component published							
no reference made	13% (2)	15% (2)	0	21% (3)	19% (5)	0	
reference made	27% (4)	31% (4)	67% (2)	7% (1)	23% (6)	30% (3)	
explicit links made	0	8% (1)	0	7% (1)	4% (1)	10% (1)	
Both components published							
no reference made	0	0	0	0	0	0	
reference made	0	15% (2)	0	7% (1)	4% (1)	20% (2)	
explicit links made	20% (3)	15% (2)	0	36% (5)	31% (8)	10% (1)	
Mixed methods publication							
separate report	7% (1)	8% (1)	0	0	4% (1)	10% (1)	
explicit links made	33% (5)	8% (1)	33% (1)	21% (3)	15% (4)	20% (2)	
	100% (15)	100% (13)	100% (3)	100% (14)	100% (26)	100% (10)	

5.9.5 A longitudinal assessment of yield

It is easy to assume that studies start their lives as mixed methods studies at the proposal stage and then produce, or fail to produce, their potential yield as the studies progress. That is, that there is a steady reduction in exploitation of the mixed methods aspect of studies from proposal to publication. A longitudinal analysis of the mixed methods aspect of studies was possible for 20 studies where there was a proposal, report, and at least a two-year period for publications to emerge after the end of the study. One third of studies fitted the assumed model of gradual disappearance of the mixed methods aspect over time (see Box 5.5). These studies have been characterised as the ‘disappearing method’, with a component disappearing even when it was a large component of the whole study and there was senior qualitative expertise present in the study team. Two studies in this group were feasibility studies and this raises the question of our expectations for publications emerging from feasibility studies. However, the opposite also occurred, with examples of qualitative components appearing from non-existent or sketchy origins in the proposal, to produce strong publications. These studies have been characterised as ‘the increasingly visible method’. A third type of change over time occurred where components or their integration made a strong appearance at the report stage with little or no existence before or after that, characterised as ‘the temporarily visible method’.

The majority of studies had an unstable process of mixing over their lives. Only one third had the strong constant presence of both qualitative and quantitative components throughout their lives. These studies mostly paid attention to integration but on occasion the components were merely ‘together separately’. An important observation from this analysis was that the strength, quality, or visibility of a component at the proposal stage of a study did not necessarily predict its status at the report and publications stage.

Box 5.5 Characterisation of studies longitudinally

Unstable	“The disappearing method” (n=7)	In 5 studies the qualitative method disappeared at the publication stage. In 2 of these the qualitative component was small or poorly dealt with at the proposal stage, but in another 2 studies it was a large component of the proposal and there was a high level expertise in qualitative research at the proposal and report stages. In one study the quantitative method disappeared at the publication stage even though
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there had been a quantitative focus in the proposal. This was a feasibility study for an RCT. In one study there were no publications from a 'quick and dirty' feasibility study for an RCT.

"The increasingly visible method" (n=3)

In 3 studies the qualitative component became increasingly visible throughout the study. In one case it did not exist at the proposal stage, was included but barely acknowledged in the abstract and discussion of the report, yet yielded a publication in a top HSR journal. In 2 studies it was small or sketchy at the proposal stage. By the report stage it had equal status with the quantitative component in the abstract and discussion, and yielded a number of important publications for the study as a whole.

"Temporarily visible method" (n=2)

In 2 studies the qualitative component was non-existent or poor at the proposal stage, had equal status with the quantitative component at the report stage, and then yielded no publications. In one of the studies there was a poor quality qualitative component in the proposal where the applicants appeared to have little research expertise; however, it was undertaken and reported well at the report stage apparently due to the expertise of the contract researchers, but there were no publications from the whole study. In the other, the study was quantitative at the proposal stage, mixed in the report, but yielded only quantitative publications.

Stable

"Consistently integrated" (n=7)

There was an explicit approach to integration of qualitative and quantitative components in the proposal, report and publications. In 2 of these the lead researcher led on both components and in 2 the qualitative method had the role of handmaiden to the quantitative method. There were examples of excellent practice in mixed methods research in this category but also examples of a lack of consistency in quality throughout the life of studies. For example, in one study the proposal was excellent, the report was simplistic and the mixed methods publication 'cobbled

together'. In another, the quality of the proposal was poor yet the report and papers yielded excellent integration.

“Consistently separate” (n=1) The qualitative and quantitative components were separately discussed from proposal to publication.

5.10 Summary

- The qualitative component of this study helped to place the quantitative assessment of quality into perspective. When interviewed, researchers were keen to point out that studies tend not to be fully exploited regardless of whether they were mixed methods or not, and that mixed methods studies were undertaken where there was complexity and this might make them more challenging than other types of study. Thus any quality assessment of mixed methods studies might be in danger of expecting more of these types of studies than other studies.
- A major issue arose when attempting to assess the quality of these mixed methods studies. In many cases there was a lack of information about the qualitative methods and the mixing. Therefore it was difficult to make any judgements about appropriateness of methods, validity of methods, or sophistication of proposed analyses.
- The lack of transparency of the qualitative methods, and lack of explicit attention to their validity may have been related to their more supplementary role within quantitative-dominant studies. However, these issues were apparent for relatively large qualitative components with stand alone status as well as small qualitative components taking a supporting role to the quantitative component.
- The lack of transparency about the purpose and process of mixing methods was particularly problematic, and it is possible that a lack of terminology to describe mixing in studies contributed to this. The priority of methods was a key piece of information, especially whether a method - and this was usually the qualitative method in the context of these studies - was only there in a supporting role for the other method, or had stand alone status. It was very helpful when researchers stated that a method had dual purpose as supportive and stand alone. If it had stand alone status then it seemed appropriate to expect details about the methods and a more sophisticated analysis.

- A lack of integration in studies meant that the quality questions related to integration were irrelevant in many cases.
- Although both proposals and reports suffered from a lack of information about mixing and integration, the lack of planning in proposals implied that any integration in the study was likely to happen by accident rather than design.
- When considering the 'yield' or outputs from mixed methods studies, in some cases the qualitative research could have made a stronger contribution to a piece of research had it been taken more seriously.
- There were many missed opportunities for researchers to attempt some form of integration which might have allowed them to gain extra insights from their mixed methods studies. In particular, bringing together any qualitative and quantitative data on the same cases for a within and across case analysis, allowing findings from one method to affect the analysis of the other, and comparing and contrasting findings from different components in results chapters and the discussion chapter of a report (crystallisation).
- Only a fifth of the mixed methods studies produced mixed methods journal articles. This highlighted a concern that any extra insights gained from undertaking a mixed methods study might not be published and therefore visible to relevant audiences. However, an alternative to the approach of a mixed methods journal article was identified, which communicated any extra insights gained from a mixed methods study - sequential publication from different components, where each subsequent component drew in hypotheses, data, findings or inferences from previous components, was a very good way of publishing insights from mixed methods studies.
- There were good examples of mixed methods studies, mixed methods articles, and sequential publication of different components which engaged with integration.
- The mixed methods studies did not necessarily have a consistent existence from proposal through to publication. Studies changed their mixed methods status at the proposal, report or publication stage. They could be – or look like - mono-method studies at different stages. Studies with two large or high quality components at the proposal stage did not necessarily result in a high yield at the publication stage.

Chapter 6 Facilitators and barriers to exploiting the potential of mixed methods studies in HSR

6.1 Introduction

The ways in which researchers in HSR can exploit the potential of mixed methods studies were identified in Chapters 4 and 5. These included explicitly planning the mixed methods aspects of studies as well as the individual components at the research proposal stage, making more of the contribution of the qualitative component, focusing on links between components rather than only having separate components within a study, and capturing the extra insights gained from these studies within peer-reviewed articles. Possible facilitators and barriers to implementing mixed methods studies in social, educational and behavioural research have been identified in the literature review in Chapter 2, for example having the right expertise on a research team. Interviews were undertaken with researchers who had participated in the studies identified for the documentary analysis to identify and explore facilitators and barriers to exploiting the potential of mixed methods studies in HSR.

6.2 Knowing how to do mixed methods research

In Chapter 2 it was noted that few articles and books about mixed methods research have been written for an HSR audience. An exception was a number of articles which have emerged in recent years around the implementation of qualitative research alongside RCTs. This raises a concern about whether existing knowledge about mixed methods research in the wider literature is easily available to, and used by, the HSR community. Further, the documentary analysis revealed a lack of integration in mixed methods studies in HSR (Chapters 4 and 5), with researchers not planning explicitly for it in their proposals, and missing opportunities for

integration of both data and findings. Therefore, a possible barrier to exploiting the potential of mixed methods studies might be that researchers do not know about the range of ways in which integration might occur between methods.

During the interviews, researchers described different combinations of methods and a variety of roles of these different methods. They discussed integration at different stages of a study such as at the design, sampling, and interpretation stages. Their discussions of triangulation in the context of survey and interview combinations showed an awareness of the complexities of this issue; these interviewees were wary of simple triangulation for confirmation and used the term to mean generating and comparing different perspectives from different methods. However, some gaps in knowledge were evident in that interviewees did not mention some of the integration techniques detailed in the literature. These also were rarely seen in the documentary analysis, for example data conversion or bringing qualitative and quantitative *data* together. This may simply indicate that interviewees were not explicitly asked to list types of integration, or it may be an indication of a gap in knowledge that could affect researchers' ability to plan and undertake some forms of integration. Researchers themselves were sometimes aware of a knowledge gap and wanted to see good examples of mixed methods studies or know who the experts were in mixed methods research. They cited difficulties when there were few or no examples of particular ways of mixing methods in the literature, leaving them to devise new approaches 'on the job'.

At the moment I don't feel like there is that many, I suppose it's part of the same thing actually, examples of good quality mixed studies. You know I don't feel like I've got a feel for who is doing really good quality mixed methods studies and where. It's like if people want to know how to go and do good qualitative research, people often will direct them to particular people. It's partly because people are publishing different studies in different places, and because they're not writing them up together. I do think the BMJ is quite relatively good, because I do see, I have seen more things in there than a lot of other places. It's really good when you do see them. R1

But I think that, perhaps another problem is the lack of sort of formalised methodology for doing this sort of work errrm..... You know you tend to have methodology in quantitative work, particularly in questionnaire design. You know it would be nice to have the processes linked, in some way save you having to make things up as you go along. R6

Three of the interviewees had written about their experiences of implementing mixed methods studies in either book chapters or articles. The importance of this dissemination of experience was highlighted by the way in which interviewees described the significance of particular books

and chapters about qualitative research and analysis in HSR. This literature was described as both highly educational for individual researchers and, importantly, giving credibility to qualitative research in HSR.

But then I think it then began, because people were writing stuff about qualitative research, we were getting more confident about it and realising.....I think then things snowballed quite a bit. R9

Knowledge about mixed methods research was gleaned from seeing it in action and doing it rather than studying it for a qualification, reading about it, or working with experts in it. The 'SHIP study' was cited as influential because both components were published side by side in a prominent journal (Bradley et al., 1999; Jolly et al., 1999), but mainly researchers learnt 'on the job' and built up knowledge of exploiting the potential of mixed methods research over a series of studies. Learning about mixed methods research, and exploiting the potential of this approach, was sometimes based on feelings of disappointment or mistakes made in a previous study.

I think in horror about how we first started off with, our sort of ignorance and innocence about a lot of things, and it's been good to have the experience of learning how to do things better. I mean in the early studies I appreciate now that I really didn't incorporate very good qualitative methods and it would have added a lot more to the first studies had we done that a bit - much - better, in an actual 'organised from the start' way, planned in properly with proper sort of outcomes, and I think we've sort of better achieved this in this final study. R11

6.3 Having the right expertise

Expertise in mixing methods was of *a priori* interest in this study. Above, researchers described themselves as acquiring expertise in mixing methods research over time through their experiences of previous studies. Yet researchers did not claim to have expertise in mixed methods research. Only one researcher used a positive description of expertise in mixed methods when describing a colleague as an expert in synthesising findings from different methods – this researcher worked in the field of social research rather than HSR. Other researchers acknowledged that mixed methods research was the natural approach they took in research, without acknowledging that they might have expertise in mixing methods. They described themselves as having 'all round skills' and "we do mixed methods" (R19) or "I'm a hybrid researcher" (R3). For some researchers there was even an indication of discomfort with

an expertise in mixed methods, calling themselves “mixed (laugh) bag” (R16) and “a bit of a jack of all trades and master of none!” (R11). Thus a group of researchers were building up experience in mixed methods studies in HSR without explicitly acknowledging their expertise in it. In fact they were sometimes surprised at how many mixed methods studies they had previously worked on when describing their experiences during the interview. This suggests that an expertise in mixed methods approaches is not taken seriously in HSR and it is possible that this may inhibit the development of the area, and researchers’ ability to fully exploit the approach.

Yes I wonder, I would be quite interested in who does it and what their sort of qualifications are, because I feel a bit of an amateur really. I've sort of dropped into qualitative research slightly by accident I suppose, but I've not been on any postgraduate courses to learn to do the methods, I've just been learning on the job, and it would be interesting if you came up with any recommendations I suppose almost for how people might be trained across the divide. So yes, interesting, I ought to go on a course I suppose. R8

Expertise in mixing methods may have been of *a priori* interest, but researchers themselves were more interested in discussing the importance of having team members with expertise in the range of methods used within a study. Although expertise in statistics and health economics were described as important, by far the most commonly discussed expertise was in qualitative research. Interviewees who regarded themselves as quantitative researchers expressed either delight at the level of expertise of their qualitative researcher colleagues or disappointment with the lack of expertise of qualitative researchers they had worked with in the past. Their recommendation was that researchers should not underestimate the level of expertise needed to ensure that qualitative research made a full contribution to mixed methods studies.

I am now looking for somebody who is very strong qualitatively [.....] the least we can do is involve somebody who has a very strong background in qualitative research, who is able to define these complex and abstract things [....] getting to the nitty gritty of the impact of disease on patients [...]. Now I may be wrong, I may be completely wrong about this being a possibility, but until I've explored and had the input of a very senior qualitative person, I'm not prepared to stop at where we are and say its good enough [...] you know we have expert qualitative researchers around. R2

But I have to say I was very cynical about that, because the sort of consultant we got in I felt he decided what the answer was before we'd started [...] But [my more recent collaborator] was an incredibly senior experienced qualitative researcher, so it felt like a different process. R8

This raised the possibility that the qualitative components of mixed methods studies may not be used to full advantage unless there is an expert in qualitative research on the team. Therefore interviewees' discussions of expertise on the team of the study included in the documentary analysis were placed alongside the assessment of that study in terms of the publications emerging from the qualitative component (see integration grid in Appendix D). A lack of senior expertise was not always directly related to a poor yield. A study with senior qualitative expertise did not publish the qualitative component; a lack of respect for qualitative research within the team was cited as a causal factor for this. Conversely, a study with no senior qualitative expertise published excellent papers on the qualitative component, and the interviewee described the high value given to the qualitative component by senior members of the team. Therefore team members valuing and respecting qualitative research may interact with the level of expertise on the team. Additionally, some parts of any type of study may not be published due to time constraints and personal life events, and indeed a senior expert in qualitative research, working in a team which respected qualitative research, cited personal reasons for the lack of publication of their work.

Another concern of interviewees was getting the right spread of expertise amongst the contract researchers on a team. This was raised as a challenge to undertaking mixed methods research. If both qualitative and quantitative skills were required then researchers had difficulties knowing whether it was best – or even possible - to recruit someone who had expertise in both methodologies, or recruit separate part-time qualitative and quantitative contract researchers. If one person was employed then they might not have the skills to do one component to a high enough standard – or indeed either component – or funding might not be available to recruit two researchers of a suitable standard. The importance of the quality of the contract researcher was noted in the documentary analysis, where one study seemed to have improved between proposal and report due to a good contract researcher and another seemed to have deteriorated, with a simplistic report authored by the contract researcher. It was also apparent when a principal investigator (PI) who was approached for an interview for this study passed the request to their contract researcher. This researcher was undertaking the data collection and analysis on the study, and felt that they knew the most about the study.

6.4 Valuing mixed methods – of intrinsic or strategic value?

In the interviews, the main justification given for using mixed methods was grounded in valuing the different strengths of the two methodologies to address complex health issues (see Section 4.4). Many of the researchers saw the value of undertaking mixed methods studies when the research questions demanded this approach. They also viewed funding bodies as valuing mixed methods research - there was a perception that some funding bodies were 'into' mixed methods, asking either explicitly or implicitly for a mixed approach. Some funding bodies were identified as pushing for the inclusion of qualitative research within totally quantitative studies and vice versa, thus forcing the existence of mixed methods studies. This 'push' was rarely explicit, where a funding body forced two sets of researchers to work together, but arose from researchers' perceptions that mixed methods research was required to obtain funding. Researchers feared that responding to funding bodies' desire for mixed methods studies could result in paying lip service to mixed methods research. Thus, as noted in Chapter 2, mixed methods studies may not be undertaken for their intrinsic value but more for a strategic purpose of obtaining funding (Barbour, 1999).

So there is a sense in which in some studies you shoe horn a bit of qualitative work in because you think that will get you the funding. R7

AOC: Did they actually make a call for mixed methods?

I: I think they still use multi-disciplinary actually, which is not the same thing (laugh).

AOC: Right. That's how you read it when they say multi-disciplinary, you think...

I: That's now how I interpret it. R13

Other strategic uses of mixed methods studies were identified, for example undertaking a survey within a study as a 'safety net' for dissemination because of the credibility it offered, and undertaking qualitative research within a study as a safe guard against a null trial which might prove to be unpublishable without a qualitative component.

But sometimes it is handy to have that kind of safety net of, you know, a nice big survey behind your fieldwork. R10

This kind of mixed methods is a bit like apple pie, I mean, you know, people are thinking it's a good idea. The question is how it is done and for what purposes? R15

One could argue that if the value of a mixed methods approach to a researcher is to obtain funding, or improve dissemination, then exploiting the potential of a mixed methods study may not be of interest or importance. The component added for strategic purposes may be undertaken poorly or only published if it is deemed necessary, and integration of data or findings may not be on the researcher's agenda at all.

6.5 Valuing or fearing integration?

As discussed above, the purpose of the mixed methods aspect of a study might be to gain funding or aid dissemination, and therefore integration might not be of value to the research team. Researchers did value integration but not necessarily of the type focused on in Chapters 4 and 5, that is, integration between findings and data. First of all, integration could occur at the level of a research community, as noted in the literature in Chapter 2, as mixed methods studies brought together different types of researchers who would challenge, argue with, and educate each other. It is possible that this might have an impact on how researchers would then go about doing their single method and mixed methods studies. Secondly, integration could occur at a research team level with cross fertilisation of work practices and ideas.

Yes, although they have bought into...We have [a number of intervention sites] all around the country, and one of the guys from the [quantitative group] has come on a number of visits and fed back their early [findings] to some of the sites [...] there is some blending of the two. R10

I: It's a very kind of interested-in-each-other relationship.

AOC: An integrated team is what you've described.

I: Yes. R7

Integration was not seen as the only benefit of mixed methods studies. Although some researchers saw integration as being the most important aspect of mixed methods research, and were dismissive of methods running alongside each other separately, others were keen to point out the value of the separate components because some types of questions only get addressed

when the funding is there for a quantitative study. For example, one quantitative researcher was open to qualitative methods and this led her to seek opportunities to add qualitative studies to her RCTs.

I mean to some extent they can say something usefully separately, because I think the [project] papers said something useful separately. But I think you know, you probably can say something, if you can find ways of combining it, you can probably get, possibly maybe you just get something different, not necessarily stronger always, but I think it will add something, I think. R1

Yet some interviewees identified integration of methods as a sign of a good quality mixed methods study (see Chapter 5), whether they integrated within their studies or not. The high level of value placed on integration in interviewees' talk did not match the findings of the documentary analysis, which generally showed a lack of integration and missed opportunities for integration in HSR studies. This may be because they value types of integration not included in the documentary analysis but also it seemed that much of the integration discussed as occurring within studies was hidden within research teams and not visible in reports and publications. Three researchers described how the qualitative research affected the way in which they interpreted the whole study, the spirit of the study, or the lens through which the study was viewed. Two of these studies were completed studies in the documentary analysis but there was no sign of this effect in either the reports or the peer-reviewed articles. It is possible that this 'invisible' integration may simply be an account, a perception, or a desire of the researcher, or that it may be occurring but in ways that are invisible within the public face of studies. Researchers may need to capture this integration in their reports and articles to communicate how they have exploited the potential of mixed methods studies.

I think one advantage of a mixed methods study, the spirit of the study can be very much influenced by the fact that it has a qualitative component with some of the sort of approaches that you take, when you look at qualitative research, particularly the reflective aspect. R3

And it is very powerful as to how you then look at the whole study, and I think it's fascinating how we do begin to look at it slightly through some of the patients' quotes (pause). R8

AOC: And [the article is] going to draw on both aspects of data collection?
I: No, it will draw visibly on the quantitative one, but not visibly on the qualitative one. R13

The type of integration looked for in the documentary analysis required researchers to bring together data and findings from two components. In some studies this was not valued so no attempt was made to do it, or it occurred but in ways which were not visible in the public face of studies. Where it did occur visibly, the PI of the study was instrumental in making it happen by taking responsibility for one component affecting the conduct or analysis of another, or for synthesising the results of different components. However, the PI could also actively manage a lack of integration. In evaluations, particularly but not exclusively in RCTs, the PI was sometimes wary of potential damage to the quantitative study by the qualitative research. The fear was that the qualitative research would 'mess things up' in terms of uncovering information awkward to the quantitative component, or even contaminate the study by acting partly as an intervention. Quantitative researchers were seen by qualitative researchers as being more concerned about this damage.

But that was partly done because [the project lead] was worried about issues of contamination within the trial, and so that was one justification for it [...] there were issues about we're getting information from the qualitative what do we do with it, because if we were just doing a trial we might not have had that information in that way, and how do we act on it? [...] So in terms of whether, I don't think I had the same concerns about contamination. R1

Qualitative research could also be seen as threatening because it took a critical stance on a policy or was not understood by some researchers on the team. Also, some types of integration were seen as more acceptable than others, in particular convergence of qualitative and quantitative findings was valued but discrepancy between findings from different methods could be seen as a concern. It is possible that the fear of damage, contamination, criticism, and contradiction from the presence of a qualitative component within a mixed methods study may result in the lack of publication of one component or efforts to keep components separate rather than integrate.

6.6 Methodological disrespect, not paradigm wars

One of most commonly discussed issues in the literature on mixed methods research is the challenge presented by qualitative and quantitative methods being associated with different paradigms and the subsequent difficulty of mixing them (Chapter 2). Yet paradigms were rarely explicitly addressed in the documentation of mixed methods studies in HSR (Chapter 4). This did not appear to be due to ignorance of the paradigm debate because interviewees were able to articulate the debate and some identified philosophical positions they adopted in their research. Rather, researchers felt that health services research was an applied field and therefore they put their efforts into undertaking the research and not into philosophical debate. Nonetheless, some

interviewees had only recently acquired this understanding of paradigms even though they had undertaken a number of mixed methods studies in the past, and others felt that not all researchers understand the paradigm debate and that there was scope for further education on this issue in HSR.

Researchers rarely described paradigmatic struggles associated with bringing qualitative and quantitative *research* together in the same study, but rather the struggle associated with bringing qualitative and quantitative *researchers* together within research teams. Qualitative researchers described quantitative researchers making judgements about the quality of qualitative research based on values associated with quantitative research. They felt that some quantitative researchers did not respect qualitative research and that they were constantly asked to justify their methods or fight for space to talk about their work within team meetings. This lack of respect was communicated both explicitly and implicitly. Humour could make it more acceptable, for example one qualitative researcher described a demeaning name given to the qualitative research by the PI of their project, and a quantitative researcher felt the lack of respect for quantitative research was communicated surreptitiously through banter and jokes.

I think the other thing is respect for the different disciplines, because you can pull together a group of people from different disciplines into a study, and you can make, you know you can make, I mean if you run the study without respect for those other disciplines then those disciplines don't fare very well. [...] So you can do a lot with just making sure the disciplines feel respected and equal. R16

AOC: How did [some of the quantitative researchers] show their lack of enamour?

I: By asking the same question all the time, the same questions all the time, I suppose (laugh). Well it's about sort of representativeness and whether sort of smaller samples could be, and what you can get out of it. R11

Respect was defined as being open to other approaches to research, understanding different approaches, and being willing to be involved in the 'other' approach. This required that qualitative research be treated as equal to quantitative research within a study, that is, valued rather than seen as a second class component of a project. Although interviewees described a lack of respect for qualitative research mainly, they felt that mutual respect was needed between researchers because some qualitative researchers could lack respect for quantitative research. Thus, any attempt to work together, or integrate methods, required that all researchers on a team be open to different ways of doing research.

And I think there is a lot of respect for qualitative work within the team, so I don't feel that it's a second class component of the project, I feel it's a genuine contribution to the whole project, and that we are working together, and that [the PI] respects and takes on board my suggestions. So it's, you know, I have worked on things where the qualitative has been simply about providing some illustrations for the quantitative research or whatever. So it's partly about the working relationship being a good one, and actually I find that increasingly important in doing this sort of research. R7

And some of that might come from some people's experience of very different ideological views and a sort of competition between, and an unwillingness to give up a pure way of looking at things. It somehow reminds me of different religions and whether they're open to views of other schools of thought or not. So what might have come from that is a lack of awareness amongst each type of researcher about the strengths of the other one and ways of getting synergy from the two. R18

When discussing respect, some researchers described conflict which had occurred within research teams. The interviewees usually spoke carefully, and with discomfort, pausing while they chose their words. Past experiences had left some qualitative researchers feeling damaged. There was however no evidence of quantitative researchers expressing hostile views about qualitative research in the interviews. Interviewees were usually respectful of different types of research and researchers. This may be because they were a selected group of researchers who were willing to be interviewed, or because they wanted to give an account of being open minded and without prejudice. Interestingly, the interviewee most willing to discuss a lack of respect for the 'other' approach was a qualitative researcher.

Have you been talking to some quantitative people as well to balance out these rabid anti-quantitative views (laugh). R10

The consequences of a lack of respect for different methods, particularly qualitative methods, were often detrimental to exploiting the potential of mixed methods studies. Integration of data and findings was not something that was likely to occur in the midst of conflict, and some disrespected components could be lost as a study progressed. For example, a lack of respect for qualitative research was posited as the reason why a qualitative component had disappeared from one study and had never been published. However, a possible consequence of conflicts between researchers was an increased chance of integration in future mixed methods studies as

both types of researchers described choosing to work in the future with researchers who respected different types of research.

Methodological differences between researchers were not always seen as problematic. They could be positively enjoyed and celebrated within teams. That is, they could facilitate exploiting the potential of mixed methods studies, leading researchers to new insights. Descriptions of this resonated with the dialectical approach to paradigm differences discussed in Chapter 2 (Caracelli & Greene, 1997). Interviewees who enjoyed these differences tended to produce a high yield from their studies or discuss 'invisible integration' occurring within their teams (see Section 6.5).

I think that's been wonderful here because it's the tensions between the different things that spark ideas, and spark off thoughts, and spark off discussions. And we've had some wonderful discussions in the team, quite often related to the qualitative type, research type, field and objectives and thinking and the hard numbers and where they collide, and whether they can expand and explain each other. And as researchers that's what made it a joy, the discussions and arguments if you like that spark out of that. It's interesting. R11

Much of the researchers' explicit and implicit discussion of paradigms focused on a lack of respect between team members and the need for mutual respect for, and equality between, different methods and researchers. They discussed methodological differences rather than the more usual ontological or epistemological differences discussed in the literature on mixed methods research (Chapter 2). There were, however, a few examples of the epistemological struggles discussed in the literature that might arise as researchers attempt to collect and analyse both qualitative and quantitative data sets. Individual researchers who were engaged in both methodologies within a study struggled to find a philosophical space which allowed them to work between data sets, while others described an internal conversation which allowed them to see the differences between the two types of research as they worked between them. Neither of these approaches came easily to the researchers. For example, with the latter approach, researchers could find themselves making decisions about one method which they felt were inappropriate because they were grounded in a paradigm associated with the other method. In the main there was little of this type of discussion around epistemological challenges and one interviewee suggested that this may reflect the fact that researchers in HSR have tended to treat the methods as separate components within a study rather than attempt to integrate them.

But what we haven't had is any kind of errrm...epistemological difficulties. Now it may be that that's because we haven't tried combining them yet, I don't know. R20

6.7 Integrated, segregated and disintegrating teams

Interviewees described different types of team working in their mixed methods studies. In 'integrated teams' some or all of the team members would meet frequently and communicate about the emerging findings, or the qualitative and the quantitative leads would meet frequently to discuss the analysis of the qualitative data. Researchers in these types of teams wanted to learn about the methods they were not familiar with and were willing to adopt work practices associated with other methods. Mixed methods studies were seen as fun and stimulating, and this was considered to be an essential ingredient if researchers were to talk and write together.

So it's really....It's been wonderful from that point of view of introducing me to another side of [quantitative methods], which is fascinating, exciting, productive. So that's what's been interesting, and it's enjoyable as a work experience. R7

Team history seemed to be important here in that some teams had a history of working together, and there was a sense of teams building up relationships over time. However, it did not appear to be essential because one team which had come together for the first time for a study was described as integrated. Early conflicts around a lack of value of qualitative research within a team could disappear as team members gained experience of what qualitative research could deliver. Or paradigmatic differences could be explicitly addressed at the start of a study so that, at the very least, they did not get in the way at the analysis stage of a study. Geographical proximity between team members could also facilitate an integrated team. Teams where researchers from both the qualitative and the quantitative components worked in the same establishment had discussions and debates throughout the development of the study. The result of integrated team working was publications which were explicit about the influence of one method on another, as described in the quote below, or 'invisible integration' (described in Section 6.5), an issue which only emerged in the talk of researchers who worked with this team model.

I think it's because they've always physically run side by side all the time, we've always had the meetings, we've always had the discussions, between all

the different aspects of the team. And it's always been felt that the qualitative stuff does help explain the RCT, and they have run in parallel so closely all the time. It's just team working I think, that's why. And because I have been there in both camps all the way through, which has helped I think. Well I suppose everybody has been involved, but perhaps I have been the one involved in both camps more than anyone else really. R11

A second model was where essentially there were two teams – one independently undertaking the qualitative component and the other independently the quantitative component. Even in the integrated teams described above, researchers had responsibility for, and led, different components and could describe the existence of two teams. The key difference here was around the degree of communication which occurred between teams. In this model, the two teams worked separately, with only a few key meetings throughout the study. The outputs from these teams were different methods reported in separate chapters of the final report, and articles in separate journals with little reference to the existence of the other parts of the study. Integration could occur in these teams if the PI took explicit responsibility for pulling together both parts of the study. This more separate approach to different components working together was not unique to qualitative and quantitative researchers. For example, health economists were described as adding their discrete parts to reports.

So you know I've been up to [AREA C] a couple of times, they've been down from [AREA C] a couple of times, the senior people I am talking about. But essentially you know we are all busy people, and it's difficult to do more than phone and e-mail conversations, and that can you know support an existing relationship but doesn't further strengthen it. [...] The qualitative data, in some ways it's a struggle with the multi-site thing, I can't answer you directly. It's been led by [AREA C]. They have organised the transcriptions, they have done the preliminary analysis, such as it is, I can't really say with confidence, and again this is one of the struggles. I mean I am the Principal Investigator on the study, at the end of the day, you know I carry the anxiety, and there is a sort of clarity that the qualitative strand is delegated out [...] it makes it difficult to answer questions like 'where are we at? R14

The final model was where a member of a team felt alienated or was described as being alienated from the team. In all cases this was the qualitative researcher who was described as not being given the time to discuss their work within team meetings, was barely consulted about articles using the qualitative research, or was continuously asked to justify their methods. Teams could continue to function with these conflicts but some conflicts were deeply felt and resulted in loss of a component of a study in the report or articles.

Key aspects of team working were described as openness to other methods, respect for different types of research and researchers, and communication. Personalities were considered to be important in that they could ease communication or increase conflict. As can be seen from some of the quotes above, a key team member was the PI who appeared to have a significant influence on how teams worked. If the PI valued integration and communication then integrated team working occurred even in the face of methodological disrespect. If the PI did not value integration in a specific study then components were kept separate, no integration occurred, or disrespect was allowed to continue.

The key thing is that I was PI. [...] So I think you have to have a PI or a set of PIs who are willing to let [integration] happen. R16

6.8 Hierarchy in HSR

The significance of the PI to the level of integration occurring within a study draws attention to hierarchy within teams. Most of the PIs interviewed were quantitative researchers and they determined the content of the study proposal and the final report. This quantitative dominance reflected the priority of methods in mixed methods studies in the documentary analysis (see Chapter 4). Qualitative researchers were not necessarily applicants on studies and in one case the qualitative researcher was a contract researcher without senior qualitative support who felt like 'a poor relation', afraid to speak out in project meetings. This lack of a senior qualitative researcher was not identified as problematic in another study because the research leads were described as valuing qualitative research, not simply in a supplementary role to the quantitative research, but as important in its own right. Thus the PI had a powerful role in allowing each component to make a full contribution to a study and giving each component 'capital' in terms of time for discussion and space in the final report. PIs not valuing qualitative components may explain why these components were sometimes ignored in abstracts and discussions in final reports, or lost at the publication stage.

What I was doing this morning was, I was taking the report that she had written, and tried to integrate it into the report of the whole study [...] You know her, the style of [qualitative researchers] is quite different from the style of health services researchers and it's written in quite a different sort of language [...] So you know this sixty page document that [the qualitative researcher] wrote, which I was going to cut down to thirty pages, to make it more digestible. R3 (quantitative researcher, PI, talking about the qualitative researcher)

It was actually [the PI] who wrote it, edited the final report and different people took responsibility for chapters. It was [his] responsibility to pull it together, and I think he's done a fantastic job I think of putting [over] the messages from across the chapters, but I think each chapter still has its own voice. R6 (qualitative researcher)

Team structures are likely to merely reflect the wider structure of a research community. Historically, health services researchers have used quantitative methods, with qualitative methods and researchers as newcomers within the field. Because of this, qualitative methods may have less status within projects and qualitative researchers may be more likely to be lone voices on a team or in a department. Additionally, the HSR community operates with a hierarchy of evidence with RCTs as gold standard evidence. Thus the HSR community, and research teams within it, are shaped by the dominant paradigm associated with RCTs. This hierarchy appeared to create a tide which qualitative researchers felt they were swimming against, feeling they had to work hard at convincing people around them of the worth of qualitative research.

So those are the sorts of circumstances I would feel I was sort of slightly fighting a battle with my colleagues, who don't really understand. I mean you know, you think people are going to understand qualitative research but actually then you suddenly realise that they don't, they don't actually understand what it's all about. They don't actually understand the analysis should be quite rigorous, there are procedures [cant hear]. Or people have very fixed, or rather limited ideas about what qualitative research can do. I've got one particular colleague on this trial, who shall remain nameless, who is very strong on the quantitative side, who grudgingly has come to accept that qualitative research might have some role as a sort of preliminary to other things, but I can't really shift his main thinking, which is that science is really about [...] hypotheses and testing hypotheses rigorously. R9

Medical dominance in HSR was described as propagating this hierarchy, and indeed medicine was the main discipline of PIs in the mixed methods studies in the documentary analysis (Chapter 4). A number of examples were given of clinicians at the top of the hierarchy who were wedded to quantitative methods and needed to be convinced of the value of qualitative methods. However, it was not as simple as this. There were also examples given of clinicians championing and leading qualitative research, and indeed a number of the interviewees in this study who were medically trained either led qualitative studies or worked closely with their qualitative colleagues.

6.9 Structural incentives and disincentives

So far the emphasis has been on individual researchers and research teams. The hierarchy of evidence operating in HSR has been shown to affect the status of methods, and the status of researchers, within research teams. However, researchers and research teams operate in research environments which can either promote or discourage exploiting the potential of mixed methods studies.

Local work environments and funding bodies were identified as promoting mixed methods research. Researchers described the availability of different disciplines within their research units and departments as facilitating a mixed methods approach. Over time, as more mixed methods studies were undertaken in local environments, it was seen as the norm -“we do mixed methods” (R19). Funding bodies were also identified as powerful shapers of the type of research undertaken in HSR. Researchers closely monitored funding bodies’ constituency and values, for example, a researcher was pleased to note that a leading qualitative researcher had joined the commissioning board of a key funding body. Although some funding bodies were identified as funding mixed methods studies, and others not, overall, some of the key funding bodies in HSR were seen as actively promoting mixed methods studies by calling for multidisciplinary research. This promotion of mixed methods studies however is not the same as promotion of exploiting the potential of mixed methods studies. As noted earlier, the desire of funding bodies for mixed methods approaches could encourage researchers’ strategic use of mixed methods research where the aim of mixing methods was to gain funding rather than integrate methods for further insights. The amount of time and money offered by funding bodies was also seen as a challenge to exploiting the potential of mixed methods studies because teams might not be able to afford to fund contract researchers in both methodologies or ask for funding for longer studies where there would be time for integration of methods.

In mixed method studies I think that is right. It would be interesting to see what your other people are saying. It may be that we're just very badly organised with our timetables. And you know you're always under pressure aren't you to do something in two years, maybe three years. But if you tried, if you said this is going to take us four years, I think your chances of getting funding would be pretty slim. So and yes, I do think that these mixed method projects are more complicated, they are more costly, more complicated. They're more costly so you get squeezed then in terms of time as well. R20

Parts of the research infrastructure were identified as not being set up to deal with mixed methods studies. Ethics committees presented challenges because they were shaped by the dominant paradigm associated with RCTs. There was a need to convince them of the rigour of qualitative research, or they did not engage with qualitative research, or their processes could not accommodate the way that the development of one method was dependent upon the completion of another method in some mixed methods studies. Also, current ways of training researchers made it a challenge to find contract researchers who were proficient in both methodologies. There were further structural constraints on *exploiting the potential* of mixed methods studies. Tight deadlines were problematic when using methods sequentially, and researchers described running out of time to undertake a synthesis of findings or to publish all possible articles. Both contract researchers and permanent researchers described the pressure to move on to the next contract or study without fully exploiting the potential of their current study. They felt that this constraint was relevant to all studies, not simply mixed methods studies, but that it was possibly more of a problem with multiple method studies because there was increased likelihood of something going wrong with one of the methods and causing delay. A sophisticated analysis of the qualitative data, and any attempt at integration, were seen as particularly difficult within the time constraints. Publications were also a casualty of this constraint. Either there was time only to write what were perceived to be the main papers, or the dispersal of a team resulted in separate publications by individual team members.

And so some of the data didn't come in until incredibly late, or some of the analysis couldn't be done, until very, very close to the end. And we had the report written with a couple of gaps, waiting for bits of analysis to be done.
R4

The most discussed structural constraint was journals. The hierarchy of evidence in HSR was reflected in the hierarchy of journals in HSR. Researchers argued that if the journals which are respected in HSR, and these largely are the ones with high impact factors, do not accept qualitative research then this in turn directly affects the output of a study, in that the publication of the qualitative component is not valued. Some journals which published predominantly qualitative articles were respected within the HSR community but the high impact factor journals mainly or solely accepted quantitative studies. Journal impact factors were seen as very important in the context of the forthcoming Research Assessment Exercise and thus the career development of researchers. This could directly affect study outputs as less priority was given to the publication of the qualitative component of a mixed methods study, and indirectly affect the status of qualitative research and qualitative researchers both within a team and in the HSR community.

The way the journals are set up, so like the BMJ predominantly, but not always, has traditionally taken quantitative papers, so it's hard to put

qualitative research, or to mix those two things up, and it's getting the experience of the reviewers. I think it's a quantitative journal policy. I think that would have to change. R13

Even high impact factor journals which accepted qualitative papers were described as having such strict word limits that this shaped the type of qualitative paper which could be written. Word limits were also identified as prohibiting attempts at mixed methods articles, as did concerns about whether journals would accept this type of paper in the first place. It could feel like a Catch-22 situation to stay within the required word limit of a journal whilst also giving all the information the journal reviewers asked for. This was seen as a barrier to the publication of mixed methods papers, as was a perception that journal editors do not like innovative articles. However, this was not confined to the qualitative and quantitative components of a study. There could be debates within research teams about the health economics component of an HSR study and whether there was space to accommodate it within the main paper, with pleas not to “relegate the health economics to a second paper” (R17). Qualitative papers seemed to be as problematic as mixed methods papers due to the effect of a low word count on them and the challenge of writing them because they were seen as less straightforward than quantitative papers.

A related issue was that reviewers for journals were perceived as unable to engage with both components of a mixed methods article and would dismiss the component they knew least about. Even though researchers had this perception, there were instances of reviewers facilitating an increased yield from mixed methods studies. For example one reviewer of a quantitative article positively encouraged the inclusion of the qualitative component of the study. Nonetheless the whole journal and review system was seen as shaping studies and their outputs, and constraining innovation.

But the problem is that the more innovative you are in that kind of co-analysis phase, the less publishable it is. So in terms of looking at, and as you mentioned, the closest we get is side by side papers, or the kind of stuff I've done which is you know the RCT didn't work and here is a little bit to say possibly why. They're kind of not very good qualitative analysis because it's a subsidiary kind of analysis but independently done. And the real kind of gap in the market methodologically I suspect is good methods of joining, along on the whole research design process, so that for example we avoid the situation which I am normally in where there is an RCT and there is a bit of qualitative stuff tacked on. R14

An important issue to understand is that researchers are part of these structures. They review studies for funding bodies, review papers for journals, and sit on ethics committees. The power of individual researchers within the system was described in many of the interviews as they encouraged a qualitative component of a study into existence, influenced a quantitative researcher not to reduce the size of a qualitative chapter in a draft report, or helped a qualitative researcher be reassured of the quality and usefulness of their contribution.

And they have social scientists – [named researcher] is the Chair of their Health Services Research panel. [...] So you know it's got in there, you know qualitative researchers have sort of infiltrated these large funders, and I think that's a good thing. R3

It's very kind of gratifying to see that the reviewers also commented that the [qualitative] chapters were interesting. R4

6.10 The necessity of serendipity and effort

The norm defined by the system appeared to have a powerful effect on researchers' ability to exploit the potential of mixed methods studies. Outside the context of mixed methods research, researchers described how the established requirements for undertaking 'quality research' made it difficult to be innovative. For example they perceived that it might be difficult to obtain funding without using the SF36 regardless of whether it was a suitable outcome measure for a particular group. Given that researchers perceive that the current system is not set up for innovation in mixed methods studies, one would expect researchers working within the current structures to struggle to exploit the potential of these studies.

Many of the researchers used the term 'luck' when talking about their experiences in mixed methods research – being lucky to work within a good team, being lucky to have a boss who supported qualitative research, or being lucky to have a job. Luck played a particularly important role in one study in the documentary analysis where the lack of respect of the PI for the qualitative component remained throughout the study and yet surprisingly the qualitative component was published in a high ranking journal. Serendipity was necessary in exploiting the potential of this mixed methods study: a reviewer for the journal, on reading the paper based on the quantitative component, asked for more about the qualitative component of a study and by luck the PI was away and could not make the decision about how to respond; the qualitative researcher was able to take advantage of this opportunity and submit a publication. It is possible that serendipity is part of people's talk more generally and is not related to mixed methods

research. However, it was significant that researchers who attempted to engage with integration were also more likely to talk about luck.

[My boss] was also very interested in the social science side of public health. So I was lucky. R5

There was also a lot of effort described in the talk of some interviewees. Qualitative researchers talked about struggling and battling to convince colleagues of the worth of their approach. A researcher engaged in explicit integration described similar struggles and battles with both funding bodies and journal editors. Exploiting the potential of mixed methods studies seemed to require hard work and effort.

It took us a few years to get through, you know we were absolutely convinced we were doing the right thing, but then no one would listen to us. So we did have to battle a bit. R16

6.11 A changing climate

The hierarchy of evidence and the effect this has on the status of methods and researchers was seen to work against exploiting the potential of mixed methods studies. Yet researchers noted how over time the research climate had changed towards being favourable both towards qualitative research and mixed methods research. This was a climate both within the researchers' departments and in the general research community. Multidisciplinary environments within departments, and funding bodies requesting multidisciplinary research, had promoted the existence of mixed methods studies and improved the understanding and use of qualitative methods, and therefore the contribution qualitative research could make within mixed methods studies. These environments were described as continuing to improve, for example the development of groups of qualitative researchers rather than lone qualitative researchers, which allowed them to assert their approach to research within mixed methods studies.

And qualitative research in the [research unit] is I think much, much stronger now than it was at that time, and I was saying, I was actually talking to somebody about [the mixed methods project] and I think in some ways the opportunity I had with [the mixed methods project] in terms of qualitative research I probably would not have now, if I'd been at the same point in my career, because there are people who are really strong in terms of qualitative

research, and there are other people feeding into sort of trials in qualitative research, and I suppose not just qualitative research, but that sort of, the more sort of social constructionist perspective as well, whereas that wasn't there at the time. And that really wasn't, I mean that whole collaboration, there just actually weren't people doing qualitative research in a lot of the institutions. R1

Accumulating experience of qualitative research, and the contribution it could make, was giving this methodological approach increasing acceptability and credibility, building on the credibility derived from the publication of key books and journal articles on qualitative research.

Researchers who had been hostile to qualitative research could change their view and become champions of it. Interestingly, a researcher situated in the social research community felt that qualitative research had attained dominance and feared a growing lack of ability to undertake quantitative research.

Climates do not simply change but are shaped by researchers and other players in the system. As detailed above, researchers who had worked with colleagues who were not open to different methodologies made decisions about working with people who respected different methods. Thus they created local environments within their teams and departments which were conducive to exploiting the potential of mixed methods studies. However, some parts of the system were noted as not changing, such as the ease with which researchers could publish innovative papers drawing on both methods. There was also a sense of impermanence about mixed methods research, with it seen as a fad or a trend. That is, that the wind was currently blowing in favour of mixed methods research but might at some stage blow another way.

I think the climate is different now and you know maybe it's a pendulum and it'll all swing back again. R3

6.12 Discussion

A core theme from the analysis was the research team undertaking the mixed methods study. A team with the right motivation, the right expertise, with respect for different methods, working closely together and communicating, could exploit the potential of mixing methods by exploiting the contribution of each method, and attempting some form of integration of methods, be that visible or invisible in the public documentation of the study. Some teams in the study became dysfunctional because some individual members lacked respect for qualitative research, leading

to the loss of a component. Some teams worked as separate qualitative and quantitative camps, leading to separate publications. Others worked in a more integrated fashion, leading to cross fertilisation of work practices and insights, and sometimes explicit discussion of integration in publications.

This resonates with theoretical reflections and empirical research on teams, where team working has been characterised as multidisciplinary, interdisciplinary, and transdisciplinary (Robertson et al., 2003; Rosenfield, 1992; Tress et al., 2005). Multi-disciplinarity is where disciplines work in parallel or sequence, offering different pieces of a jigsaw and producing the sum of their parts (Tress et al., 2005). There are varying definitions and distinctions made between interdisciplinary and transdisciplinary working. Both terms can be used to describe disciplines working closely together to produce new knowledge, where different paradigms come together and researchers focus on a common goal from the beginning. Thus rather than researchers from different disciplines working separately, they understand and get involved in both components of a study and share their different viewpoints of findings and interpretation. When a distinction has been made, interdisciplinary research has been defined as disciplines working together on the *same* problem which still results in findings being reported by discipline (Rosenfield, 1992), and transdisciplinary research has been identified as a way of cutting across disciplines, blending together concepts to develop a shared approach to research, to lead to developing new insights through more in-depth and extensive analyses. In the field of landscape ecology this has been called ‘integrative research’ (Tress et al., 2005).

The lack of integration in many mixed methods studies in HSR may be explained by the prominence of multidisciplinary team working in HSR. Funding bodies were described as requesting a multidisciplinary approach to studies and researchers described local environments conducive to multidisciplinary working. The teams which attempted integration, described in the above findings as ‘integrated teams’, matched descriptions of a more interdisciplinary or transdisciplinary approach: “each team member needs to become sufficiently familiar with the concepts and approaches of his or her colleagues as to blur the disciplinary bounds and enable the team to focus on the problem as part of broader phenomena” p1344 (Rosenfield, 1992). Facilitators of this approach in HSR appeared to be that the PI understood and respected the contribution of both components, there was equality between researchers, researchers from both components were geographically close to allow frequent meetings, and teams built up a history of working together. International research on how to exploit the potential of transdisciplinary research has drawn similar conclusions. Examples of both social science dominance and medical dominance have led to a call for different disciplines to work as full partners and interchangeable leaders on studies (Rosenfield, 1992). Additionally, team history and learning to work together have been highlighted as important to attaining transdisciplinary research (Rosenfield, 1992). Indeed interviews with 19 researchers and a

survey of researchers who had worked on five integrative studies in landscape ecology echoed many of the findings in this study (Tress & Tress, 2005). In landscape ecology funding bodies liked integrative research and the positives for researchers were acquiring new skills, gaining new insights, and enjoying their work. The negatives were that communication was difficult, publications were hard to obtain because journals were perceived as not publishing interdisciplinary papers, and the merit system did not help career paths. Important issues for good integrative research were planning for integration, communication, team work, and planning for publications. Interestingly, researchers reported enjoying a study more if there was integration within it.

In this study, even teams which worked in an interdisciplinary way did not necessarily produce publications which explicitly documented integration. This issue has been highlighted about interdisciplinary research more generally, with recommendations to make the methods of interdisciplinary research transparent and explicitly consider within studies how key the integration of disciplinary perspectives was to obtaining a more powerful explanation of the issue under study (Robertson et al., 2003). Barriers to visible integration in mixed methods studies in HSR appeared to be mainly structural. For example, valued peer-reviewed journals did not necessarily publish qualitative or mixed methods papers or offer a word count appropriate to such papers. Again, this has been highlighted as a barrier to interdisciplinary research, with calls for “an infrastructure of research organisations, academic journals, funding committees and informal networks of researchers that actively foster interdisciplinary research” (Robertson et al., 2003).

Transdisciplinary research has been described as needing structural changes in training, supportive academic institutions, and career opportunities. It also requires researchers to “be courageous risk-takers” and not to be discouraged by the lack of incentives (Rosenfield, 1992). Both risk avoidance and risk-taking were apparent in mixed methods studies in HSR. One researcher in this study actively avoided risk-taking to ensure career progression while another researcher described taking risks and battling to obtain funding and publish their innovative article.

The lack of interdisciplinary working, and the lack of infrastructure to support it, is not unique to HSR or to England. The difficulty of interdisciplinary working has been identified for health and social research internationally (Rosenfield, 1992). The same structural barriers have been identified, namely no training in this type of work, journals established on disciplinary lines, and career paths associated with single disciplines. This is almost certainly true of HSR structures and affects more than the mixed methods aspects of studies. Health economics is another important component in many studies in HSR and interestingly the tendency to

undertake different components of a study separately, and publish them separately, has also been noted for the effectiveness and cost effectiveness of interventions (Greenberg et al., 2004).

6.13 Summary

- Mixed methods research in HSR in England has much in common with interdisciplinary and integrative research in other fields and other countries.
- The structures of HSR appear to support multidisciplinary working – that is, mixed methods studies producing the sum of their parts – rather than interdisciplinary outputs which are explicit about extra insights attained from integration in mixed methods studies.
- Currently, exploiting the potential of mixed methods studies in HSR is likely to require luck and effort on the part of individual researchers.
- The agency of individual researchers shapes research structures, as well as being shaped by those structures, and a changing research climate is likely to facilitate further exploitation of mixed methods studies in HSR.

Chapter 7 Integration between the documentary analysis and the interviews

7.1 Introduction

A key theme running through this thesis has been the importance of integrating data and findings to exploit the full potential of mixed methods studies. The approaches taken to integration within this thesis have been described in the methods chapter (Section 3.5). Some of these have occurred already in previous findings chapters (Chapters 4-5) and others will occur later in the thesis in the discussion chapter (Chapter 8). The aim of this chapter is to describe in detail the range of approaches taken to integration and the way in which learning identified from the literature review in Chapter 2 and the empirical research in Chapters 4-6 has been used to exploit the potential of this mixed methods study.

7.2 Using the sampling information from the documentary analysis within the interviews

Integration was built into the study at the design stage, with links between the two components at the stages of both sampling and data collection. The yield from studies identified in the documentary analysis was used to sample cases for the interviews to ensure a spread of studies assessed as exploiting the potential of mixed methods research or not within the qualitative component of the study. Specific issues arising about a study from the documentary analysis were added to the interview schedule to obtain more information about these issues and why they might have occurred.

This approach to combining methods has been described in the literature (Chapter 2) and shown to be used commonly in HSR studies (Chapter 4). However, a key finding from the

documentary analysis (Chapter 5) was that researchers in HSR have sometimes ignored this extra sampling information within their qualitative analysis, or at least appeared to ignore it because there was no explicit reference to it in the study documentation. Rather than ignore this information, the quantitative assessment about 'yield' from the documentary analysis was combined with the themes from the qualitative interviews. As described previously in the methods chapter (Chapter 3), data from both components were summarised on an 'integration grid' for each case. This allowed within-case and across-case comparison of qualitative and quantitative data on what was essentially a small number of cases – 21 studies discussed in 20 interviews (See Appendix D for the grid). This was most useful in exploring the relationship between the themes and the resulting yield of a study in the qualitative analysis (Chapter 6). The grid was ordered by whether studies were completed or not, and then ordered from good yield through to poor yield to allow these comparisons to be made easily. For example, this aided the identification of negative cases to challenge and deepen the analysis when senior expertise in qualitative research was shown to be neither essential nor sufficient to ensure qualitative publications. In Chapter 5 a concern was expressed that small numbers might limit the usefulness of this approach because statistical tests would be underpowered to test associations and hypotheses. In this study the analysis took place in the context of the qualitative analysis and therefore this was irrelevant.

7.3 Crystallisation of findings in Results Chapters

Crystallisation of findings from different components was identified as an approach to integration in the literature (Chapter 2). In the documentary analysis, crystallisation occurring in the results as well as discussion chapter of any report was identified as helping to exploit the potential of mixed methods studies (Chapter 5). Therefore this was attempted in the results chapters here by drawing together findings from the two components of the study – the documentary analysis and the interviews – on similar topics and reporting them together where appropriate. For example, in Chapter 5 the quality of mixed methods studies in HSR was explored mainly using the findings from the quantitative documentary analysis. However, interviewees' views of quality in mixed methods studies were reported prior to the quantitative findings, where researchers identified exploiting the potential of a study as a challenge to all studies, regardless of whether they are mixed methods or not. This introduced a note of caution of not to expect too much from mixed methods studies when interpreting the quantitative quality assessment.

No formal technique was used to facilitate crystallisation. However, the focus of the researcher had to move from 'findings from a method' to 'findings about an issue'. This change of focus

allowed connection to be made between findings from different components and sometimes forced an exploration of an apparent discrepancy. For example, interviewees talked about valuing integration but there was little evidence of it in the documentary analysis; this encouraged a further exploration of the qualitative themes to understand why this might be.

7.4 Analysis of interviews affects documentary analysis

In the literature review it was noted that the analysis of one component could affect the analysis of the other component in a study (Chapter 2). This was identified as a way of further exploiting the potential of some mixed methods studies in HSR (Chapter 5). In this chapter, issues identified in the interviews as facilitators and barriers to exploiting the potential of mixed methods studies (Chapter 6) were used, where possible, as hypotheses to test in the documentary analysis. As noted in the methods chapter (Section 3.5), this may be a rather unusual approach to take within a single study, but it is one which has been used recently in the context of synthesis of qualitative and quantitative evidence (Oakley et al., 2006).

7.4.1 Methods

Issues were identified in the interview study (Chapter 6) which may facilitate or hinder the exploitation of mixed methods studies in HSR. These were used as hypotheses and tested using data from the quantitative documentary analysis about the quality of mixed methods studies in HSR (Chapter 5). Although a quality assessment was undertaken on 45 proposals and 47 reports, only a subset of these proposals and reports could be included in some of the hypothesis testing. Some of the hypotheses involved an association between an issue and the types of publications emerging from a study. For only 21 proposals and 47 reports was there a period of at least two years after the completion of the study for publications to emerge. Publications were considered to be peer-reviewed journal articles only for these analyses.

All variables used in hypothesis testing were dichotomised due to small numbers. Fisher's Exact Test 2-sided p-values are reported. A large number of tests have been undertaken and therefore a cautious approach has been taken to interpretation of the tests.

7.4.2 Association between motivation for mixing methods and yield

The possibility arose in the interviews that studies where there was strategic use of mixed methods research, rather than use for its intrinsic value, might result in a lack of integration. Unsurprisingly, researchers did not state in the documentation of their studies whether or not the motivation for using mixed methods was strategic. However, around a third of proposals and reports contained some justification for using a mixed methods approach. The presence of a justification in documents was used as a proxy for the research team valuing a mixed methods approach for their research question as opposed to valuing it for other reasons. The studies where the mixed methods aspect was valued might be expected to have produced a good mixed methods yield, and to have produced publications from the two components with explicit links between components. There was evidence that presenting a justification in the *proposal* was more likely to result in a good mixed methods yield, and some evidence that this may also be the case for publications from both components where the link between components is explicit (Table 7.1).

Table 7.1 Association between presence of a justification for using mixed methods research and extent of integration of components

	PROPOSAL		REPORT	
	Justification 'YES/ YES BUT'	Justification 'NO'	Justification 'YES/ YES BUT'	Justification 'NO'
Type of publications				
Both published, explicit links*	71% (5)	21% (3)	50% (8)	23% (7)
Other	29% (2)	79% (11)	50% (8)	77% (24)
		p=0.06		p=0.10
Good yield				
Yes/Yes but	75% (12)	28% (8)	53% (8)	47% (15)
No	25% (4)	72% (21)	47% (7)	53% (17)
		p=0.00		p=0.76

* a mixed methods paper or two components published separately, all with explicit links made between methods

7.4.3 Association between expertise and yield

In the interviews (Chapter 6), having senior expertise in a method was seen as important for the success of a mixed methods study. If an expert in one component was not present at either the proposal stage or the report stage of a study then that component might be lost at the publication stage. This issue has already been explored further in Chapter 6 by comparing the types of publications emerging from a study with interviewees' perceptions of expertise on a team. This showed that the presence of expertise did not necessarily result in publications for a component because respect for a component could counteract the presence of senior expertise. That is, the relationship between expertise and yield did not appear to be a straightforward one. Nonetheless an attempt was made to test whether studies with documented expertise in qualitative research amongst their proposal applicants or report authors were more likely to produce qualitative publications. The focus was on qualitative expertise, rather than quantitative expertise because this was cited as a problem in the interviews.

It was difficult to extract the expertise of researchers for a large proportion of studies in the documentary analysis. Studies where there was not enough information about expertise were combined with the few studies assessed as lacking expertise. There was no evidence of an association between expertise and yield (Table 7.2).

Table 7.2 Association between expertise in qualitative methods and yield

	PROPOSAL		REPORT	
	Expertise 'YES/ YES BUT'	Expertise 'NO/NOT ENOUGH INFORMATION'	Expertise 'YES/ YES BUT'	Expertise 'NO/NOT ENOUGH INFORMATION'
Type of publications				
Qualitative published*	67% (6)	42% (5)	50% (8)	48% (15)
Other	33% (3)	58% (7)	50% (8)	52% (16)
		p=0.39		p=1.00
Good yield				
Yes/Yes but	46% (12)	42% (8)	35% (6)	57% (17)
No	54% (14)	58% (11)	65% (11)	43% (13)
		p=1.00		p=0.23

* in any way – alone, separate from quantitative, or part of mixed methods paper

7.4.4 Association between geography and yield

In the interviews (Chapter 6) there was a suggestion that integrated teams may be more likely to occur where both qualitative and quantitative researchers were working in the same place. In the documentary analysis, some study background variables were extracted which might indicate geographical closeness of the team: number of departments, number of organisations and number of geographical areas of proposal applicants and report authors. Ideally the geographical location of the lead qualitative researcher and the lead quantitative would be used but this was not extracted.

Integrated teams – or teams working in one or two departments, one organisation or one geographical area - might be expected to produce a good yield, integration at the analysis stage of a study, and publications from both components with explicit links. There was no evidence of this (Tables 7.3 (a)-(c)) and in fact the two statistically significant associations showed the opposite to be the case.

Table 7.3 (a) Association between number of departments in the team and yield

	PROPOSAL		REPORT	
	No. of departments 1-2	No. of departments 3+	No. of departments 1	No. of departments 2+
Good yield				
Yes/Yes but	44% (4)	50% (10)	55% (12)	47% (9)
No	56% (5)	50% (10)	45% (10)	53% (10)
		p=1.00		p=0.76
Type of publications				
Both published, explicit	25% (1)	50% (5)	24% (5)	47% (9)
Other	75% (3)	50% (5)	76% (16)	53% (10)
		p=0.58		p=0.19
Integration at analysis				
Yes	33% (3)	15% (3)	13% (3)	26% (5)
No	67% (6)	85% (17)	87% (20)	74% (14)
		p=0.34		p=0.44

Table 7.3 (b) Association between number of universities/organisations on the team and yield

	PROPOSAL		REPORT	
	No. of organisations	No. of organisations	No. of organisations	No. of organisations
	1	2+	1	2+
Good yield				
Yes/Yes but	83% (5)	42% (11)	55% (11)	48% (11)
No	17% (1)	58% (15)	45% (9)	52% (12)
		p=0.17		p=0.76
Type of publications+				
Both published, explicit	0% (0)	46% (6)	17% (3)	46% (11)
Other	100% (3)	54% (7)	83% (15)	54% (13)
		p=0.25		p=0.06
Integration at analysis				
Yes	50% (3)	15% (4)	10% (2)	25% (6)
No	50% (3)	85% (22)	90% (18)	75% (18)
		p=0.10		p=0.26

Table 7.3 (c) Association between number of geographical areas on the team and yield

	PROPOSAL		REPORT	
	No. of geographical areas	No. of geographical areas	No. of geographical areas	No. of geographical areas
	1	2+	1	2+
Good yield				
Yes/Yes but	50% (7)	50% (9)	52% (13)	53% (9)
No	50% (7)	50% (9)	48% (12)	47% (8)
		p=1.00		p=1.00
Type of publications+				
Both published, explicit	14% (1)	56% (5)	17% (4)	50% (9)
Other	86% (6)	44% (4)	83% (19)	50% (9)
		p=0.14		p=0.04
Integration at analysis				
Yes	29% (4)	17% (3)	16% (4)	22% (4)
No	71% (10)	83% (15)	84% (21)	78% (14)
		p=0.67		p=0.70

7.4.5 Association between the Principal Investigator and yield

The PI was identified as a significant team member in the interviews (Chapter 6), and one who could promote integration. Little information was extracted about the PI in the documentary analysis – only the discipline of the PI was collected as part of the background details on each study. In the interviews, a number of interviewees mentioned medical dominance and clinicians' preference for quantitative research. This suggested that medically trained PIs and lead authors might be expected to produce low integration, low yield, and loss of the qualitative component. Having said this, it was also the case that some of the researchers interviewed were medically trained and appeared to value both qualitative research and integration. Nonetheless this was explored and there was some evidence to support it (Table 7.4).

Table 7.4 Association between discipline of lead researcher and yield

	PROPOSAL		REPORT	
	Medical	Other	Medical	Other
Good yield				
Yes/Yes but	44% (12)	64% (7)	23% (4)	69% (11)
No	56% (15)	36% (4)	77% (13)	31% (5)
		p=0.48		p=0.01
Type of publications+				
Qualitative published	29% (4)	100% (5)	23% (4)	67% (10)
Other	71% (10)	0% (0)	77% (13)	33% (5)
		p=0.01		p=0.03
Integration at analysis				
Yes	19% (5)	27% (3)	0% (0)	19% (3)
No	81% (22)	73% (8)	100% (17)	81% (13)
		p=0.67		p=0.10

7.4.6 Association between fear of damage and yield

In the interviews in Chapter 6, some researchers were concerned about the potential for the qualitative research to contaminate or damage the quantitative component; this fear was unique to evaluations. Therefore, compared with other types of studies, one might expect evaluations to have lower yield, less explicit linking in publications, and less integration at the analysis stage. There was no evidence of this (Table 7.5).

Table 7.5 Type of study by yield

	Evaluation	Other
Type of publications+		
Both published, explicit links	27% (7)	35% (8)
Other	73% (19)	65% (15)
		p=0.76
Integration at analysis stage in report		
Yes	15% (4)	19% (4)
No	85% (22)	81% (17)
		p=1.00
Good yield in report		
Yes/Yes but	42% (11)	57% (12)
No	58% (15)	43% (9)
		p=0.38

7.4.7 Association between the changing climate and yield

Researchers in the interviews (Chapter 6) suggested that the climate was improving for mixed methods studies. They did not say that mixed methods studies were improving but one could argue that if the conditions necessary for exploiting the potential of mixed methods studies improve then some aspects of mixed methods studies might improve. It is difficult to study publications over time because studies undertaken more recently have not had time to publish. Other quality indicators can be assessed over time such as transparency of methods, presence of expertise, integration, and yield. There was very weak evidence of improvements over time in proposals, but not enough reports were available for the 2000s to make this comparison useful for reports (Table 7.6).

Table 7.6 Changes in quality indicators over time

	PROPOSAL		REPORT	
	1990s	2000s	1990s	2000s
Good yield				
Yes/Yes but	37% (7)	50% (13)	48% (19)	57% (4)
No	63% (12)	50% (13)	52% (21)	43% (3)
		p=0.55		p=0.70
Qualitative expertise				
Yes	42% (8)	69% (18)	35% (14)	43% (3)
No	58% (11)	31% (8)	65% (26)	57% (4)
		p=0.13		p=0.69
Transparency of qualitative research				
Yes	37% (7)	65% (17)	65% (26)	71% (5)
No	63% (12)	35% (9)	35% (14)	29% (2)
		p=0.08		1.00
Analysis integration				
Yes	5% (1)	31% (8)	20% (8)	0% (0)
No	95% (18)	69% (18)	80% (32)	100% (7)
		p=0.06		p=0.33

7.5 Crystallisation of findings in Discussion Chapter

Findings have been brought together in the Discussion chapter (Chapter 8) to give ‘a bigger picture’ of exploiting the potential of mixed methods studies in HSR. Again, formal techniques have not been used to facilitate this. The summary findings at the end of each results chapter were considered together to address the overall research question about exploiting the potential of mixed methods studies in HSR.

7.6 Summary

- A number of approaches to integration have been taken in this mixed methods study. The quantitative variable used for sampling qualitative cases was included in the qualitative analysis, crystallisation of findings was undertaken in the results chapters rather than leaving it all to the discussion, the qualitative component raised hypotheses for further analysis of the quantitative component, and crystallisation of findings was undertaken in the discussion chapter (see Chapter 8).
- Integration involving *analysis* took place after the individual components had been analysed separately. This chapter highlights the way in which integration can take place in the context of a qualitative analysis or a quantitative analysis. Attempting to integrate by the qualitative component raising hypotheses for the quantitative analysis – that is, integration in the context of a quantitative analysis - was rather disappointing due to small numbers and missing data limiting the power of analyses.
- Insights emerging from the integration included the understanding that expertise in qualitative research was important to, but neither necessary nor sufficient for exploiting the potential of studies; viewing the quality of mixed methods studies in the wider context of expectations of all types of studies; and identifying that researchers who offer a justification for using a mixed methods approach in their proposals may be more likely to produce a good yield.

Chapter 8 Discussion

8.1 Introduction

The aim of the thesis has been to explore how researchers in HSR might fully exploit the potential of mixed methods studies. A literature review was undertaken to identify ways of exploiting the potential of mixed methods studies; a documentary analysis was undertaken of proposals, reports and publications from mixed methods studies in HSR to determine how these studies were exploited; and researchers from these studies were interviewed to explore the facilitators and barriers to fully exploiting this approach in HSR. In this discussion, key findings are summarised (Section 8.2), strengths and limitations of the thesis are considered (Section 8.3), generalisability and transferability of findings are discussed (Sections 8.4), reflections on what can be really be achieved from exploiting the potential of mixed methods studies are made (Section 8.5), conclusions are drawn (Section 8.6), and recommendations are made both for the HSR community and future research (Section 8.7).

8.2 Summarising key findings in the context of other research

8.2.1 Mixed methods studies in HSR – a common approach warranting further investigation

A finding from this study is that mixed methods studies appear to be common in HSR, accounting for 18% of HSR studies funded by ten Department of Health programmes in the period 1994-2004. There is also some evidence that use of this approach is increasing in HSR. This estimate of the frequency of use of mixed methods studies is both higher and lower than that found elsewhere, both within and outside the health field. Elsewhere in the health field, only 1% (37/3830) of papers in clinical journals were found to use both qualitative and quantitative methods (McKibbon & Gadd, 2004), and ten of 26 (38%) evaluations located in health journals in 1995 (Murphy et al., 1998) and 8% (14/170) of primary research studies on long term conditions (Turner-Stokes et al., 2006) were found to use a mixed methods approach.

These estimates from elsewhere are based on peer-reviewed journal articles which, as we know from this thesis, are rarely the product of mixed methods studies. In another research field, 13% (145/1156) of articles in education journals were mixed methods research (in Bryman, 2006a). Thus there is a great deal of variation in estimates of use of this approach and no supporting or conflicting evidence about the frequency of use of mixed methods *studies* as opposed to mixed methods *articles*. Nonetheless it appears that mixed methods studies are common enough in HSR to be identified as an important methodological approach warranting further study.

8.2.2 The meaning of 'exploiting the potential'

There is no existing set of criteria by which to judge whether the HSR community is fully exploiting the potential of mixed methods studies. There are many ways of making judgements about this. The approach used here has been to focus mainly on the *processes* of undertaking a mixed methods study, that is, identifying the extent to which studies in HSR draw on the range of ways of mixing and integrating methods identified in the literature. There has also been some focus on *outcomes* in terms of the types of publications emerging from studies, in particular whether publications capture some of the mixed methods aspects of studies. The argument has been that if researchers make use of the range of processes available, and produce publications which address the mixed methods aspects of studies, then they are fully exploiting the potential of these studies.

Alternative approaches to studying the exploitation of mixed methods studies in HSR would have been to address whether mixed methods studies are used when they are necessary, and only when they are necessary; to ask research stakeholders such as commissioners and users of research whether they feel that these studies are being undertaken in the most useful way; or to take a more outcome-focused approach by assessing the insights gained from such studies which would not have been available to mono-method studies. The approach taken has focused on a *researcher* perspective of undertaking a mixed methods study, rather than the perspective of a research commissioner or research user. This is an important perspective because the type and quality of knowledge generated by researchers depends on the way in which they employ their methods.

8.2.3 Where HSR is exploiting mixed methods studies

One could argue that the HSR community is exploiting the potential of mixed methods studies simply because they are drawing commonly on this methodological approach. Historically studies in HSR have tended to be purely quantitative and therefore types of questions which

qualitative methods can best address are now being considered rather than ignored. Of course the types of questions best addressed by qualitative methods can be dealt with using purely qualitative studies. A point made by some interviewees in this study was that some questions may only be addressed using qualitative methods because the quantitative research is being undertaken. It may be that the most acceptable way of undertaking qualitative research within HSR is within mixed methods studies rather than purely qualitative studies. This may be due to the established hierarchy of evidence in HSR or the importance of quantitatively oriented questions within this policy related field.

In this study, the HSR community appeared to be drawing on the wide range of roles of both qualitative and quantitative methods identified in the literature, as detailed in Table 4.4. Common roles were quantitative methods determining the sample for qualitative components, qualitative methods generating the content of survey instruments, and qualitative methods helping to develop health care interventions and study how these interventions worked in practice in the context of evaluative studies. This use of qualitative methods to study and understand interventions which are under development or evaluation is much less usual outside the health field (Bryman, 2006a).

In the studies here, mixed methods were undertaken to increase the scope of a study and to facilitate or improve a method, rather than for confirmation. This lack of use of methods for confirmation could be seen as a gap in how mixed methods research is used in HSR. However, it is unlikely to be problematic because of the difficulties of using methods for confirmation, and because confirmation may be a luxury in the context of policy-related research where there are numerous questions to address (Professor David Morgan, personal communication). The infrequent use of confirmation as a purpose of mixing methods has also been found in social research (Bryman, 2006a).

The HSR community appeared to be making a significant contribution to the use of qualitative research alongside RCTs, with researchers contributing to the literature on mixed methods research. Health services researchers have written excellent publications on mixed methods research in this context, detailing how qualitative research can be used to develop and understand an intervention under study (Bradley et al., 1999), how it can be used to improve the design and conduct of trials (Donovan et al., 2002), and the challenges it poses if it identifies problems with the trial or intervention (Riley et al., 2005). All of these publications focused on integration – a key aspect of mixed methods research – and researchers in HSR are continuing to produce publications with this focus. Recent additions include exploring a discrepancy between findings from the qualitative component and the RCT in a pilot study (Moffatt et al., 2006), and detailing the way in which a process evaluation can affect the analysis of the

outcome evaluation (Oakley et al., 2006). This focus is leading researchers to consider the procedures for integrating methods and the rigour of integration (Oakley et al., 2006). The focus which the HSR community is taking on integration in the context of qualitative research alongside RCTs is very welcome given the scope for further integration in many of the empirical studies assessed here.

Researchers in HSR have undertaken some excellent mixed methods studies and integrated methods at various stages of a study. From the empirical research undertaken here, there is no doubt that the HSR community is building expertise, and experts, in this approach.

8.2.4 Ways in which HSR can further exploit the potential of mixed methods studies

Researchers in HSR can further exploit the potential of mixed methods studies by:

- *drawing on a wider range of the qualitative methods available* rather than relying heavily on individual interviews. This frequency of use of interview studies in mixed methods research is very similar to social research where 71% of mixed methods articles were based on interview studies compared with 67% here (Bryman, 2006a). Of course the questions posed in HSR may be best addressed by individual interviews, but this may also indicate a neglect of potentially useful qualitative methods such as observation and documentary analysis.
- *exploiting the contribution of the qualitative component* by using it in a stand alone role as well as to develop the quantitative component; that is, not limiting it to a 'supporting role'. This would lead to publication of the qualitative component of studies from more studies, and therefore wider access to the insights gained from these components of mixed methods studies.
- *planning the mixed methods aspects of a study in the research proposal* by explicitly justifying the use of a mixed methods approach, describing the purpose and timing of methods in relation to each other, and describing where and how integration would take place. Creswell has promoted this type of clarity in proposals for mixed methods studies in educational research in North America (Creswell, 2003). One could argue that unless there is some explicit planning, then forms of integration may occur by accident rather than design.
- *integrating data and findings from different methods*. The most significant gap identified here was the lack of engagement of researchers in HSR with integrating data

and findings from different methods, particularly at the analysis stage of studies. In Chapter 2 a number of approaches to integration were detailed that were rarely used in HSR. A lack of integration has been found within social research as well as HSR (Bryman, conference, Manchester, 2005). Recent publications in social and health research indicate a renewed interest in integration (Moran-Ellis et al., 2006; Oakley et al., 2006; Plewis & Mason, 2005): Oakley and colleagues offer examples of process evaluations alongside RCTs where, for example, hypotheses identified in the process evaluations are tested in the outcome data set; Plewis & Mason discuss the quantitising of qualitative findings for use in statistical models to explain variation in outcomes of new interventions and services.

- *displaying extra insights from integration in publications.* The outcome of many of the mixed methods studies here was publications which did not demonstrate the links made between methods, that is, show that one component was better because of the existence of another component, or that new insights were gained in some way from integrating methods. Mixed methods publications were not the only way of doing this. For example, in the wider literature, a paper on an RCT discussed inferences from the qualitative component which had been published elsewhere to offer a wider picture of how the intervention worked (Jolly et al., 1999); a methodological piece was published alongside this paper showing how the qualitative research affected the intervention and the understanding of the intervention tested in the parallel publication (Bradley et al., 1999).

8.2.5 What helps and hinders exploitation

A number of facilitators and barriers to fully exploiting the potential of mixed methods studies were identified in the literature (Chapter 2), and in interviews with researchers who had worked on mixed methods studies in HSR.

Paradigms

Two issues relating to paradigms dominated the literature on mixed methods research - the incommensurability argument and the need to find a philosophical place from which to undertake such studies. These were raised as barriers to undertaking mixed methods studies. Documentation from the HSR studies here rarely mentioned paradigms, indicating that, if researchers struggled with this issue then they certainly did not articulate this in the public face of their studies. This lack of discussion of paradigms is by no means unique to HSR, because only 6% of 232 mixed methods articles in social research mentioned paradigms in any way (Bryman, 2006b). In HSR, this did not appear to be due to ignorance of the arguments because

interviewees in the empirical study articulated the known arguments. Nor did many interviewees raise issues around epistemological or ontological challenges of mixing methods in practice. One interviewee suggested that this could be due to the lack of integration of data and findings in practice. Indeed the few interviewees who discussed difficulties did so in the context of integration of methods or a single researcher undertaking both methods.

Epistemology and ontology were rarely raised as barriers to either doing mixed methods studies in HSR or exploiting their potential. The lack of prominence given to epistemological and ontological issues has also been found amongst social researchers (Bryman, 2006b). Rather it was *methodological* differences between researchers which could facilitate or hinder mixed methods studies producing at least the sum of their parts and a whole more than the sum of the parts. The dominance of quantitative methodology in HSR left some qualitative researchers feeling that they had to justify and explain their methods. Researchers delivering one component of a study could make judgements about the quality of the other component based on criteria relevant to their own component. This often caused difficulties as some groups dismissed small non-probabilistic sample sizes or the lack of feedback to participants as 'poor research'. This lack of understanding of, and respect for, the 'other' methodology in a study could result in loss of components and a lack of integration between methods.

Mixed methods research has been seen as a paradigm shift in its early stages (Miller & Fredericks, 2006). There was a sense that a paradigm shift might be occurring in HSR which facilitated mixed methods studies, as funding bodies actively encouraged these types of studies and some researchers in HSR identified themselves as 'doing mixed methods research'. This shift however had not necessarily facilitated exploiting the potential of mixed methods studies in terms of integration between methods.

Education in mixing methods research

Researchers in HSR may not have planned the mixed methods aspects of their studies, and practised integration, because they did not understand how to do so. Researchers in HSR have had some exposure to the literature on mixed methods research generally (Barbour, 1999) and specifically in the context of qualitative research alongside RCTs. However, the body of literature directed at the HSR community is not large, and further exposure is needed. A sign of the changing climate and active interest in mixed methods research is the recent appearance of chapters on this subject in key text books for the HSR community (Adamson, 2005; O'Cathain & Thomas, 2006).

Although there is a large body of knowledge about mixed methods research, there appears to be a gap in knowledge generally in terms of formal techniques for integration. Some interviewees explicitly identified a need to see models of good practice in mixed methods research and discussed how they had learnt to combine methods and integrate methods 'on the job'. The invisibility of mixed methods studies and integration in peer-reviewed articles appeared to limit learning. Some researchers have attempted to describe their processes of integration in detail, for example a social researcher has described working between survey and interview data (Mason, 1994), nurse researchers have described using meta matrices originally designed for use in qualitative research (Happ et al., 2006; Wendler, 2001), and researchers in HSR are beginning to add to this literature (Oakley et al., 2006). Formalising a technique by describing it, and most importantly naming it, can help researchers to learn techniques and can offer credibility to a process. An example of this in qualitative research is the detailed description of 'framework analysis' (Ritchie & Spencer, 1994). An example in mixed methods research is 'ethnographic residual analysis' for combining regression with case studies (Fry et al., 1981). Researchers in social research have recommended further work on this and have begun to describe and name integration techniques such as 'following a thread' (Moran-Ellis et al., 2006). Challenges are likely to arise as researchers engage in formalising integration techniques, for example dealing with bias and small numbers when analysing qualitative and quantitative data together. This is a challenge that is being explored in mixed methods research in the 2006 Methods Festival in Oxford (www.ccsr.ac.uk/methods/festival/ accessed 5/5/06).

An increase in the literature about mixed methods research directed at the HSR community, and a growing level of expertise within research groups as they 'learn on the job' indicates that there might be a natural improvement in how mixed methods studies are undertaken as time progresses. This may be facilitated by researchers writing about the implementation of their mixed methods studies and writing publications which explicitly describe integration. However, this gap in knowledge in HSR probably requires a more structural change than individual researchers reading and writing about mixed methods research. There is a potential gap in formal education around mixed methods research and perhaps the need for Masters in HSR to cover this subject explicitly. This gap in formal education in mixed methods research has been identified outside HSR - by researchers focusing on mixed methods research in the UK for the ESRC National Centre for Research Methods (conference November 2005) and in educational research in the US (Creswell et al., 2003). Changes to curricula may involve discrete additions of sessions about mixed methods research to modules which deal separately with qualitative and quantitative methodology, or a more radical upheaval of having research methodology modules which simultaneously cover the different aspects of both methodologies within a mixed methodological framework (Onwuegbuzie & Leech, 2005). The addition of discrete sessions is probably more acceptable in HSR currently, although even this small change is potentially challenging in terms of designing content and finding people to teach these sessions.

Expertise in mixed methods research

If researchers are to exploit the potential of mixed methods studies then they need expertise in each method, and expertise in mixing and integrating methods. Expertise in individual methods is likely to come from different team members rather than a single researcher because team working is common in HSR. Because of this, team working, as much as the expertise of individuals, is likely to influence the extent to which the potential of mixed methods studies is exploited.

There were examples of PIs on studies who were gaining expertise in mixing methods and integration. However, there appeared to be little ownership of this expertise. Recognition of this expertise by the HSR community may encourage its development, which may in turn facilitate the exploitation of mixed methods studies.

Teams

Team working is pretty much the norm in HSR, although this may not be true of other fields (Massey et al., 2006). Dysfunctional team working in HSR, caused by a lack of respect for different methodologies within a team, could lead to mixed methods studies which were not even the sum of their parts. Multidisciplinary teams, where researchers come together to provide their piece of the jigsaw in a study, were common in the HSR studies here. These types of teams could produce the sum of the parts of mixed methods studies by publishing from each component. However, multidisciplinary team working has not necessarily been the goal of researchers elsewhere because it has left researchers with a sense of superficiality (Massey et al., 2006). Interdisciplinary team working, where researchers communicate and share data, analysis, findings and work practices has been described as a goal which might lead to insights unavailable to other approaches to research (See Chapter 6). Producing a whole more than the sum of the parts in a mixed methods study in HSR appeared to be related to integrated teams. The PI was a key player on the team who could facilitate integration. However, interdisciplinary team working did not necessarily translate into publications which reflected the integrated working. The external research environment was identified as a barrier both to integration and interdisciplinary team working in this study, as well as in different fields of research in different parts of the world (see Chapter 6).

The research environment

Funding bodies were identified as a key facilitator of mixed methods studies here, and this has been noted elsewhere for HSR (Barbour, 1999). Their desire for mixed methods studies however could act as a barrier to exploiting the potential of these studies because integration, or publishing from all components of the study, might not be valued by researchers who are merely chasing funding. Social researchers have also expressed concern about the fashionability of this approach impacting on the quality of studies because researchers did not then plan a rationale to address the research question (Bryman, 2006b). Funding bodies could continue to shape mixed methods studies by changing their expectations of what mixed methods studies deliver. If funding bodies are happy with reports where a large qualitative component is summarised in a short chapter with no plans to publish it then this situation might continue. If they value multidisciplinary working where components are undertaken separately then this will continue. However, if they begin to value integration and interdisciplinary working then changes may occur to how mixed methods studies are undertaken and what they might ultimately deliver.

Funding bodies and the local environments in which researchers worked were seen as promoting multidisciplinary research, and therefore mixed methods research. However, another key part of the system was not conducive to outputs from multidisciplinary working within HSR or interdisciplinary working associated with exploiting the potential of mixed methods studies. Researchers expressed concerns during interviews that some key journals in HSR did not welcome qualitative research or mixed methods articles, or their word limits prohibited attempts at these types of papers.

The environment is not a passive external force but one which is serviced by individual researchers who sit on editorial boards of journals and commissioning boards of funders, and who review articles and proposals for these bodies. There was some evidence of the influence of individual researchers who exercised their power within these roles to facilitate the exploitation of mixed methods studies - interviewees described reviewers promoting the existence of a component, or publication of a component, of a mixed methods study. However, these could be viewed as mere drips where a sea change might be more appropriate. Currently, research structures do not appear to be conducive to the integrative outputs of interdisciplinary research.

8.2.6 Typologies

There are a number of existing typologies of mixed methods studies and there was a possibility that one of these might help to organise the types of studies undertaken in HSR. Finding such a typology might facilitate education about mixed methods research, and possibly lead to identification of quality issues specific to each type. Within this study, finding a relevant typology might also have helped to identify types of studies which might be exploited more in HSR.

None of the typologies studied here appeared to be suitable for organising studies in HSR because some of their categories were redundant, some relevant categories were missing, and some categories were difficult to distinguish from others in practice. This may be because typologies are constructed in largely theoretical terms rather than through empirical study of examples of mixed method studies (Bryman, 2006a). This has been borne out to some extent by a researcher from North America who has been prominent in the construction of typologies; he identified only three models of designs of mixed methods studies in 5 studies in primary care, and these were different from his theoretically constructed typology (Creswell et al., 2004).

Some categories of each of the typologies studied here were rarely used. At the beginning of this research, these gaps were seen as potential ways in which the HSR community could use other types of mixed methods studies. However, this thinking was flawed because these typologies have been based on possible types with little understanding of how prevalent each type is in any research field (Bryman, 2006a). Types may not be used in HSR simply because they are not relevant to the type of research undertaken in this field. The gaps identified in the HSR studies here were not necessarily problematic for HSR, merely indicating types of studies which are problematic - those with a purpose of confirmation – and types of studies which are not necessarily relevant currently to HSR – holistic and participatory types.

The 75 studies here could have been used to develop an empirically based typology for HSR. However, application of the existing typologies revealed the difficulty of this. Studies in HSR are not simple two-component studies, one qualitative and one quantitative, where these components are mixed in one way. They can have multiple components, for example a survey, a before and after controlled study based on routine data, an economic evaluation, and observation and interview. Even where there are only two components, one component can have more than one purpose, for example interviews can be used to generate insights about a disease group as well as facilitate construction of a questionnaire. Thus it may not be possible to develop

a comprehensive typology for HSR which can capture the complexity of the mixed methods studies in use (Maxwell & Loomis, 2003). However, organising mixed methods studies into more general 'types' may be possible and helpful. Indeed Creswell has started to produce a parsimonious set of types based on empirical research (Conference July 2005). In HSR the general purpose of the research may be a good starting point for some general types - evaluation, exploration of an issue using survey and fieldwork, and instrument development. There are certainly some key sub-types of mixed methods studies which are highly relevant to HSR, such as process-outcome evaluation.

8.2.7 Quality assessment in mixed methods research

At the time this study was designed there had been few attempts to develop criteria for assessing the quality of mixed methods studies (Caracelli & Riggin, 1994). A decision was made to develop a set of questions about quality which would facilitate the exploration of quality rather than attempt to develop a set of validated criteria for the judgement of mixed methods studies.

The main finding from applying a list of questions about quality to mixed methods studies in HSR was that currently this is challenging. There were two barriers to assessing the quality of mixed methods studies. The first was a lack of information about the individual methods and the purpose and processes of mixing methods, which made it difficult to consider aspects of quality which relied on transparency, such as appropriateness and sophistication. A failure to report methodological details is an issue for assessing the quality of all types of studies (Mays et al., 2005) and has been noted elsewhere as a difficulty when considering quality in mixed methods research (Bryman, 2006b). The second barrier was a lack of integration of methods within studies so that many of the interesting aspects of mixed methods studies could not be assessed simply because they did not exist. Until researchers begin to be clearer about how methods work in their mixed methods studies and engage more in integration, extensive quality assessment may be of little use. The most useful part of the quality assessment was the exploration of yield – the analysis of written comments made after reading documents, and the types of publications emerging. This helped to identify key ways in which HSR could exploit mixed methods research.

Further consideration of quality in mixed methods studies is essential. One avenue to explore is determining quality standards for different aspects of mixed methods studies. This can be illustrated using a recent paper on transcription in qualitative research. Verbatim transcription is a sign of quality in qualitative interview studies, but researchers are beginning to question

whether it is always appropriate to transcribe in a mixed methods study (Halcomb & Davidson, 2006). It may be necessary when in depth analysis requires rich data, but it may not be necessary or cost effective for descriptive analyses of the issues raised by interviewees. There is a need for researchers to be more transparent in HSR about the depth of both qualitative and quantitative research required to address the research question(s), and a need for any quality assessment to consider this rather than apply a sweeping gold standard to all aspects of the study. This contingency approach to quality assessment, where the criteria applied may depend of the nature of the research, has been recommended for mixed methods research in social research (Bryman, 2006b).

Another avenue is the development of quality criteria for mixed methods studies.

Commissioners of HSR need to know that they have funded high quality mixed methods studies and need to determine whether a study has maximised the potential of mixing methods.

Researchers themselves need to be able to design high quality mixed methods studies and, when reviewing reports and publications, assess when their peers have done so. Researchers may also want to assess the quality of a mixed methods manuscript for publication in a journal, and to assess articles for inclusion in both systematic reviews of mixed methods studies and other approaches to evidence synthesis. Quality criteria for mixed methods studies might be useful for all of these purposes, and a critical appraisal tool may be essential for evidence synthesis using systematic review. The work undertaken here was a helpful start to this process in HSR for consideration alongside the recent work of other researchers in different fields (Bryman, 2006b; Sale & Brazil, 2004; Teddlie & Tashakkori, 2003) and recent work on evidence synthesis (Mays et al., 2005). Researchers who have assessed mixed methods papers in systematic reviews have applied qualitative criteria to the qualitative component and quantitative criteria to the quantitative component but ignored the mixed methods aspects of studies, and approaches taken to integration (Pluye et al., 2005; Thomas et al., 2004). It is important that studies are not merely judged on their individual components because insights might emerge from the mixing within studies. A researcher in HSR is planning to adopt a consensus method such as the Delphi technique to identify and agree upon a defined set of relevant quality criteria for combinations of qualitative research alongside RCTs (Dr Simon Lewin, personal communication). This may be a useful route to take for mixed methods studies more generally.

In the meantime, since a key issue is the lack of information about methods in mixed methods studies, researchers may benefit from the development of a CONSORT style statement on the *reporting* of mixed methods studies (Altman, 1996). A starting point is proposed here – the GRAMMS statement (Good Reporting of A Mixed Methods Study). These six issues can be considered for both final reports and mixed methods articles (Box 6.1)

Box 6.1 GRAMMS Statement

1. Describe the justification for using a mixed methods approach for the research question
2. Describe the rationale for mixing in terms of the purpose, priority, and sequence of methods. A diagram may be useful.
3. Describe each method in terms of sampling, data collection, and analysis.
4. Describe where integration has occurred, how it has occurred, and who has participated in it.
5. Describe any limitation of one method associated with the presence of the other method.
6. Describe any insight gained from mixing or integrating methods.

8.3 Strengths and limitations of the thesis

8.3.1 Strengths

Focused definition of mixed methods

A focused definition of a mixed methods study has been applied in this thesis, requiring at least two components of data collection and analysis, where one is qualitative and one is quantitative. This definition is used by other key researchers in mixed methods research and encompasses a common approach used in HSR. A wider definition of mixed methods studies, which might have included mixes of qualitative methods only, would have covered a larger range of studies but possibility to the detriment of a depth understanding of how to exploit studies with qualitative and quantitative components.

Timeliness of research

The research is timely, as interest grows in mixed methods research both within and outside the field of HSR. In recent years there has been a resurgence of interest in this approach with a

number of books appearing in the last few years and more expected, a new journal (Journal of Mixed Methods Research), and a new annual conference (Cambridge in July, commenced 2005). In HSR, mixed methods studies have been undertaken for many years and are likely to remain a significant part of the HSR landscape in years to come, with key funding bodies for HSR such as the NHS Service Delivery and Organisation Research and Development Programme (www.sdo.lshtm.ac.uk) promoting this approach.

Use of empirical research

The core of this study is based on empirical research. Much of the methodological literature on mixed methods research has been based on theorising, with a few key contributions based on empirical study of this approach (Bryman, 2006 (a and b); Caracelli & Greene, 1993; Creswell et al., 2004; Happ et al., 2006). Theorising is necessary and is usually informed by researchers' empirical experience. However, an empirical focus cannot avoid the complexity of research in the real world and offers insight into what is happening rather than what should happen.

Focus on mixed methods *studies*

The focus here has been on mixed methods studies rather than mixed methods articles. All approaches have their strengths and weaknesses. Mixed methods articles are the public end product of a mixed methods study and as such are likely to represent the most integrated studies (Bryman, conference, Manchester, 2005). Assessing proposals, reports, and all emerging publications offers a different insight into how researchers mix methods.

Mixed methods aspect of this study

The study has not only addressed how researchers do mixed methods research in HSR but also what they think about mixed methods research in HSR. It has offered a more rounded picture of exploitation of this approach. An attempt has been made to take the learning from the literature in mixed methods research, and from the assessed strengths and weaknesses of mixed methods studies in HSR, and use it within the analysis and interpretation of this study.

8.3.2 Limitations

Definition of mixed methods

The focused definition of a mixed methods study applied here is a limitation as well as a strength. Types of studies which other researchers might label 'mixed methods' have not been considered, in particular the mixing of qualitative methods (Barbour, 1998) and the mixing of qualitative and quantitative *approaches*, for example, where unstructured data is quantitatively analysed. This thesis does not address these types of studies even though they may be used in HSR.

Having identified a theoretical definition of a mixed methods study, it was difficult to operationalise it, and a further working definition was needed. Other researchers attempting to study the use of different methods have had problems with definitions. Authors of a review of qualitative research in health care had to further define a qualitative study as one which used "qualitative methods both to gather and to analyse data" p177 (Boulton et al., 1996). An author of a review of articles using mixed methods research in social research had to decide whether to include open questions on questionnaires (Bryman, 2006a).

Focus mainly on processes rather than outcomes

The processes used by researchers, rather than the outcomes achieved, have mainly been used to address whether researchers in HSR have exploited the potential of mixed methods studies. Integration has been highlighted as a key process. One could argue that the process of integrating findings at the publications stage of a study is related to outcomes because a justification for undertaking mixed methods studies in the first place is that they provide a bigger picture of a phenomenon. Breaking studies up into their methodological pieces at publication fails to offer a bigger picture. However, one could argue that this study has not provided enough evidence that the process of integration of *data* will deliver further insights. More evidence is required that processes of integration produce better outcomes in mixed methods studies in HSR.

National not an international perspective

Limiting the focus of the empirical research to studies funded by the Department of Health also limited the study to England rather than offering an international perspective. HSR is

undertaken in many countries around the world and an international focus may have identified different insights. This has implications for the generalisability of the findings.

Saturation in the literature review

The intention was to take a formal approach to the literature review whilst recognising that a classic systematic review was inappropriate. However, the approach was less thorough than intended because of the difficulty identifying articles about mixed methods research. It was time consuming to read through lots of irrelevant abstracts from database searches, find potential papers, order them from the library service, read them to see if they were relevant or useful, and then finally digest arguments within them. The stage of reading nine books about mixed methods research outside the field of health was a significant one. One of these books was an edited collection of over 700 pages, with 26 chapters, each the equivalent of a lengthy article, from authors from a variety of disciplines and fields (Tashakkori & Teddlie, 2003). The book took weeks to read and the next iteration into searching databases from fields other than health was driven as much by mental saturation as the intended theoretical saturation. At this stage, articles really had to indicate in their title or abstract that they might make a unique contribution before they were followed up. Because theoretical saturation was not tested as thoroughly as intended, there are likely to be other arguments, and sides of arguments, in the literature which have not been included here. However, the nine text books alone were key sources of arguments from the fields of social (Brannen, 1992a; Brewer & Hunter, 1989; Bryman, 1988; Fielding & Fielding, 1986), educational (Creswell, 2003; Gorard & Taylor, 2004) and behavioural (Tashakkori & Teddlie, 1998; Tashakkori & Teddlie, 2003) research.

Studies excluded from the documentary analysis

Some studies were excluded from the denominator of studies in HSR because an abstract could not be located. This was a small number but these studies may have been more likely to be failed studies, and failed mixed methods studies. Additionally, the response rate to requests for documentation for mixed methods studies was good but non-responders may have been more likely to be researchers on failed studies. Therefore the findings here are likely to be based on the better quality studies in HSR.

Validation of coding

Assessment of the study documentation did not include double coding to check for inter-rater or intra-rater reliability. This would have been a greater limitation if the focus of the study had

been the development of a quality checklist. However, it is an important limitation to consider, particularly for the subjective assessment of yield for proposals and reports.

Reliance on limited documentation and accounts of mixed methods research

Assessment of the frequency of use of mixed methods studies was highly dependent on the details given in summaries and some mixed methods studies may have been missed.

Assessment of the extent of integration in studies was dependent on documentation. Studies may seem less integrated in a report than they were in practice unless researchers publish candid in-depth accounts (Maxwell & Loomis, 2003).

Consideration of the challenges of undertaking mixed methods studies and exploiting their potential relied on interviewees' accounts rather than direct observation of a research team in action (Dingwall, 1997). In the way that interviewees can give accounts of being "good parents" (Baruch, 1981), it is likely here that interviewees gave accounts of being "good researchers".

8.3.3 Reflexivity

The meaning of 'exploiting the potential of mixed methods studies' was shaped by the researcher undertaking this study. I am an applied researcher and I wanted to know how to undertake these types of studies well. A commissioner of research would probably have worked with a different meaning around value for money or the appropriateness of using a mixed methods approach for different research questions. I also shaped which characteristics of the mixed methods studies were assessed, the quality questions applied, who was interviewed, as well as which issues I probed in the interviews. I was aware of this as I designed and undertook the study but my awareness increased as my supervisors challenged my findings and interpretations in the later stages of the study. I changed my approach to some parts of the research process as I reflected on how I was undertaking the study. For example, during the process of sampling for interviews I found I was choosing females and researchers who had been involved in evaluations – that is, researchers who were similar to me in some way. Having a sampling grid which displayed my requirements for maximum diversity helped me to address this.

As the study progressed I became less confident in the judgements I was making about mixed methods studies in HSR. During the interviews, researchers were keen to point out that they did

not necessarily exploit the potential of any of the studies they undertook in the pressurised culture of policy related applied research. There were always more analyses and more papers to write, so it should be of no surprise if researchers were not exploiting the potential of mixed methods studies. One could argue that I have set my sights too high for mixed methods studies, and perhaps higher than for other types of studies. One could argue that it is remarkable that anyone publishes from both components of a study and that researchers have fulfilled their requirements if they publish one paper from a study. Additionally, I have highlighted integration as an essential process in mixed methods studies, but how important is it? Delivering two components, or more, in a study may be accomplishment enough. Integration may be a luxury, a false hope, or may not be of enough value for the extra effort involved. For all this, I still feel that unless we give more attention to integration in HSR we are sailing our mixed methods flag at half mast. The uniqueness of a mixed methods study lies in the relationship between data sets, and the potential to generate new knowledge through this relationship. I would like to see researchers attempting more integration and being explicit about the costs and benefits of doing so.

8.4 Generalisability and transferability

8.4.1 Generalisability

Generalisability is relevant to the quantitative component of the study and insights gained through integration in the context of the quantitative component. The generalisability of the findings of documentary analysis can be a difficult issue (Hodson, 1999). The focus of the documentary analysis here was on HSR funded by some programmes, of one funding body, in England. To what extent might the findings be generalisable to all Department of Health funded studies, to all HSR in the UK, to HSR internationally, and to other research fields?

- The studies here did not include all HSR studies funded by the Department of Health between 1994 and 2004. This body funded research undertaken through fellowships, programmes of research, initiatives, and disease specific charities. Also the policy research programme was available up to 2001 only. There is no reason to believe that studies undertaken through these routes were different from studies here, with the exception that the focus here may be more on policy related research. The presence of a team may not be relevant to mixed methods studies undertaken as part of fellowships, unless supervisors are counted as part of a team.
- The studies here did not include all mixed methods studies in HSR funded in the UK between 1994 and 2004. HSR was funded by Regional Health Authorities, charities, and research councils over that time period in England. HSR was also funded in Wales,

Scotland and Northern Ireland. There is no reason to believe that HSR funded through other sources is different from the HSR funded by the Department of Health, except in terms of the extent to which it was policy related.

- The studies included here were based in England. The research cultures of different countries such as North America and Europe may be different from England and the findings are likely not to be generalisable outside the UK.
- The focus here was on health services research. Similar work has been undertaken on mixed methods publications in social research over a similar time period (Bryman, 2006a; Bryman, 2006b). Some of the similarities and differences between HSR and social research have been discussed earlier in this chapter, for example that both communities could integrate findings more. However, research communities are suitably different to recommend that readers are careful when attempting to generalise the findings here beyond HSR.

The generalisability of qualitative research can come from linking findings of a study to a body of theory. The findings here, on team working in mixed methods studies in HSR, were very similar to empirical findings on team working in different countries and fields of research outside HSR (Massey et al., 2006; Rosenfield, 1992).

8.4.2 Transferability

Transferability is relevant to the findings from the qualitative component and insights gained through integration in the context of the qualitative component. The context of the qualitative research has been described to allow readers to consider the transferability of the findings to other settings. The context was researchers in HSR, mainly in England, where quantitative methods dominate. All of the researchers had participated in mixed methods studies and many had participated in evaluative studies adopting quasi-experimental designs.

8.5 What can fully exploiting mixed methods studies really deliver?

The ultimate aim of HSR is to facilitate health improvement in the population and one has to ask how exploiting the potential of mixed methods studies in the ways described in this thesis can help with this aim. The focus on the processes of research within this thesis seems far removed from facilitating a healthier population. Yet HSR facilitates health improvement

through knowledge generation which is credible, relevant, and accessible. If commissioners of research identify a need for certain types of knowledge to be generated, which are best generated through qualitative as well as quantitative research, then the loss of some components of research at the publication stage of a study is highly problematic. As well as the loss of knowledge, and the loss of particular types of knowledge gained through qualitative research, there is the opportunity cost of undertaking a component of a study which ultimately never contributes to an evidence base. The lack of integration of data and findings from different methods, in the final report and in peer-reviewed journal articles, may seem less problematic than the loss of a component of a study. Yet the justification for undertaking mixed methods studies in HSR is to engage with the complexity of health and health care by taking a more comprehensive approach than quantitative methods alone would allow. Separate publication from different components may fail to offer the promised 'bigger picture' to research users, but in time this bigger picture can be gained through synthesis of qualitative and quantitative evidence. It is the potential loss of *new knowledge* gained through integration that is more problematic. In studies described here, integration stopped a misleading result emerging from the quantitative component because patients were found not to be interpreting a question in the way intended; it led to an understanding of what theory of alcohol abstinence was supported by empirical evidence as well as which one was not, giving professionals a way forward in devising interventions; and it led to increased recruitment rates in an RCT, making the RCT a viable way of addressing an important question. Synthesis of qualitative and quantitative evidence in HSR offers a good model for mixed methods studies. These syntheses are not content merely to generate knowledge from qualitative research and then from quantitative research; they explicitly attempt synthesis across the methods to generate *new knowledge*.

8.6 Conclusions

It was evident from the documentary analysis that researchers are mixing methods in a range of different ways, with quantitative methods dominating, thus reflecting the conventional hierarchy of evidence in HSR. However, researchers could further exploit this approach by being clear about the purpose and practice of mixing methods when planning their studies, exploiting the contribution of qualitative components of studies, engaging with a wider range of ways of integrating data and findings from different components of a study, and being explicit in peer-reviewed journal articles about any unique contribution made by this approach. Findings from the interviews with researchers suggest that researchers can contribute to fully exploiting the potential of mixed methods research by learning more about the different ways of integrating data and findings, respecting and understanding the strengths of the different methodological approaches, communicating with team members, and valuing integration.

In HSR a multidisciplinary approach to team working is the norm whereby study components are undertaken separately. An interdisciplinary approach to team working is less common but may be associated with exploiting more of the potential of mixed methods studies. The external research environment appears to be conducive to interdisciplinary endeavour but not to interdisciplinary outputs. Structural change, as well as change in researcher behaviour, will be necessary if health services researchers are to fully exploit the potential of using mixed methods research.

8.7 Recommendations

8.7.1 Recommendations for the HSR community

Plan the mixed methods aspects of a study

Researchers in HSR tend not to explicitly discuss mixing and integration in their proposals and reports. It would be helpful if researchers were transparent about why and how they mix methods.

Exploit the contribution of the qualitative component

Qualitative components are often included in mixed methods studies where the quantitative component is dominant. It would be helpful if researchers considered the contribution of the qualitative component to the overall research question and gave it the resources to fully contribute to the study.

Integrate

There are many ways of integrating data and findings from different components in a study. Engaging with them more may lead researchers in HSR to further insights and understanding about the issues and services under study.

Publish integration

There is a tendency to break mixed methods studies up into methodological pieces so that researchers rarely see how others have integrated data and findings, and the insights that can emerge when this is undertaken well. It would be helpful if researchers published more examples of good practice in using mixed methods research to encourage and educate researchers to integrate.

Disseminate techniques of integration

There are few publications on how researchers might combine data or findings from two components of a study. It would be helpful if researchers who have engaged with integration write about the techniques they used in their studies so that others can learn from their endeavours.

Improve education in mixing methods

Researchers need educating in combining methods as well as using them individually. It would be helpful if mixed methods research was taught on Masters in Health Services Research and other Masters purporting to equip researchers with grounding in a range of research methods. This should include paradigm debates, the appropriateness of a mixed methods approach for different research questions, the range of combinations available, the importance of integration, techniques of integration, and quality assessment.

Promote interdisciplinary research

Research structures affect the way in which researchers undertake their research and the incentives for exploiting the potential of mixed methods studies. It would be helpful if

- funding bodies consider where integration might offer more insights to the questions they pose, and encourage integration in mixed methods studies
- journal editors challenge researchers' perceptions that they do not invite mixed methods papers by specifying requirements for mixed methods papers, identifying reviewers for mixed methods papers, and requesting innovative approaches to research
- stakeholders in the research system note the significance of the team to mixed methods research in HSR and address the challenges of team working
- research commissioners promote interdisciplinary rather than multidisciplinary teams working.

8.7.2 Recommendations for further research

Quality criteria and the construction of a critical appraisal tool

There are no quality criteria for mixed methods studies. It would be helpful if further study was undertaken around quality assessment in mixed methods research. The mixed methods aspects of studies, and approaches taken to integration, should be considered as well as the individual components of a study.

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APPENDIX A Dissemination

Communicating key lessons from the literature review and empirical research: presentations at conferences, seminars and workshops

In HSR

'Increasing the 'yield' from mixed methods studies in health services research'. MRC HSR and HoP Fellows Meeting, Bristol, 22 February 2006.

'Increasing the 'yield' from mixed methods studies in health services research'. Department of Public Health and Epidemiology, University of Birmingham, 16 November 2005.

'Communicating purpose and practice in mixed methods studies'. Department of Palliative Care, Policy and Rehabilitation. Kings College London. 21 September 2005.

'Increasing the yield from mixed methods studies in health services research'. Society for Social Medicine Annual Scientific Meeting, Glasgow, September 2005. Poster presentation.

'Communicating purpose and practice in mixed methods'. Health Sciences. University of Leicester. 9 March 2005.

'Communicating purpose and practice in mixed methods'. University of Sheffield. 31 Jan 2005.

'Communicating purpose and practice in mixed methods'. Mixed Methods in Health Services Research. A one day conference for the Society for Social Medicine, Sheffield, 23 Nov 2004.

'Making the most of mixed methods'. Society for Social Medicine Annual Scientific Meeting, Birmingham, September 2004. Poster presentation.

Outside HSR

Invited speaker at the ESRC National Centre for Research Methods Summer School. Interdisciplinary and multimethod research. Southampton, September 2006.

'Medical sociologists, multidisciplinary teams, and mixed methods studies' BSA Medical Sociology Group Annual Conference. Edinburgh, September 2006.

'Multidisciplinary, interdisciplinary, or dysfunctional? The role of team dynamics in mixed methods research'. Mixed methods conference. Cambridge, July 2006.

Training event on mixed methods for the ESRC National Centre for Research Methods. Manchester, April 2006.

'Methodological opportunities in mixed methods'. ESRC Research Methods Programme, University of Manchester, October 2005.

'Increasing the yield from mixed methods studies in health services research'. Mixed methods conference. Cambridge, July 2005.

'Combining data'. ESRC National Centre for Research Methods and the ESRC Identities Programme, Milton Keynes, May 2005.

Discussant for *'The complementarity of qualitative and quantitative work'*. Meeting of the Royal Statistical Society Social Statistics Group, London, March 2005.

'When opposites attract: the marriage of cluster randomised controlled trials and ethnographic studies'. Meeting of the Royal Statistical Society Primary Health Care Study Group 'Quantitative and qualitative methods: is marriage possible?', London, June 2004.

APPENDIX B Pilot

Obtaining information on mixed methods studies in the documentary analysis

In the first pilot, a letter of request and an information sheet about the study was designed. Nine mixed methods studies on the list were identified where the lead researchers were based at the School in which this thesis was undertaken. These included studies from a variety of the funding programmes, commissioned over a range of years, and where it was known that some of the lead researchers had moved to other workplaces. Where the researcher still worked in the School, the letter and information sheet was sent through internal mail requesting feedback about the process as well as the documentation. Where the researcher had left (two studies), the letter was sent through the Royal Mail and after one week the progress of the letter was tracked. Feedback from researchers in the School resulted in changes to the letter and the information sheet, and inclusion of a postcard for participants to return indicating their intentions to send documentation or reasons for non-participation. The request for documentation had been forwarded to the two researchers who had left the School, showing that this approach had the potential to reach all researchers. This pilot was followed by a second pilot on ten mixed methods studies identified in one programme. This was successful in that respondents replied to the requests and understood what was being asked of them.

Data extraction in the documentary analysis

A draft Coding Sheet was applied to the documentation of four mixed methods studies, chosen because they had different documentation available and used different mixes of methods. The proposal of a study was read and the relevant part of the Coding Sheet completed. Then the report was read and the relevant part of the Coding Sheet completed. Then any differences between the methods used in the proposal and report were considered and documented. During this pilot process a Coding Protocol of detailed instructions about coding was constructed to aid consistency. This pilot resulted in the addition of more contextual information, more details about the roles of the individual methods, more details about the integration, and a change in the order in which data were extracted. A new draft Coding Sheet was applied to the documentation from a further four studies. The Coding Sheet worked well and the Coding Protocol was developed further during this process, with the addition of further options and clarification of instructions.

The topic guide and interview process for interview study

A pilot study of the interview process was undertaken as part of an MA in Research Methods in Sociology (O'Cathain, 2003). Three researchers were interviewed using a topic guide based on issues arising in a preliminary literature review of mixed methods in health research. As a result of this pilot, a question was added to explore the background of researchers and their perceptions of the type of researcher they are because researchers identified in the sampling process as 'qualitative researchers' might not necessarily label themselves as such. The topic guide was further developed based on the extensive literature review in Chapter 2 before use in the interview study here.

Letter of request for documentation

Dear «Name»

[Name of study]

I have been funded by the Medical Research Council (MRC) to study the development of mixed methods in health services research. As part of this process I have searched funding databases for studies making use of both qualitative and quantitative methods. You are the lead researcher identified on one of these studies (see above). I am looking for information about this study.

I want to look at the types and quality of mixed methods studies undertaken in health services research. I hope that this piece of work will help the research community to reflect on how we combine qualitative and quantitative methods, and identify good practice and ways of making the most of this approach. To do this I need a copy (hard or electronic) of the

- the full research proposal
- the final report (if the study is complete)
- references to any publications which have emerged from the study
- the names of researchers who took (or are taking) a leading role in the qualitative research and a leading role in the quantitative research

Would it be possible for you to send these items to me at the address on the letterhead or by email on a.ocathain@sheffield.ac.uk ? I am more than happy to reimburse any expenses incurred relating to photocopying or post. I am also happy to photocopy documents and return the originals to you if this is more convenient. If you need to know more about the project before making a decision, I have enclosed a leaflet explaining it in more detail. If you have ANY concerns or queries please call me on (0114) 222 0770, which is a direct line.

If you decide that you are happy to send the information then please post it or email it to the address given. As a working researcher I understand that it will require some effort on your part to locate and sometimes copy large documents from times past. You may only be able to find some of the documentation I ask for. It would be most helpful if you could locate as much as possible and I will gratefully receive whatever you can find. I have enclosed a postcard which you can send to me to let me know about your intentions.

If you feel that another researcher on the team is the most appropriate person to deal with this request, could you possibly pass this letter and leaflet to them and inform me of their details so I can contact them directly?

I am extremely grateful for these efforts. If you are interested in the study, I will happily send you the results when they are available. If you would like a copy of the results, let me know using the enclosed postcard.

Thank you in advance

Alicia O'Cathain, MRC Fellow

Coding Sheet: Type

Codes are given on the sheet below. Refer to Coding Protocol for detailed instructions about completion of questions, and new codes emerging through the process of coding studies. Specify the page numbers where the information is located in documentation.

I. DESCRIPTION OF STUDY

1. ID (unique identifier for this study)

2. Coder (1=AOC, 2=other)

3. Source of funding (1=HTA, 2= SDO, 3=PSI, 4=MCH, 5=implem, 6=CVD, 7=dental, 8=PRP, 9=forensic, 10=NEAT)

4. Start date (year)

5. Length of project

6. Cost

7. Availability of documentation (1=both, 2= proposal only, 3=report only)

8. Applicants on proposal

a. Number _____ b. No of departments _____ c. No of universities _____ d. No of geographical areas _____

e. Discipline of lead applicant _____ (free text)

9. Authors on final report

a. Number _____.....b. No of departments _____.....c. No of universities _____ d. No of geographical areas _____

e. Discipline of lead author _____ (free text)

10. Title (give full title of proposal or report)

11. Topic (give a few words to describe the topic)

12. Sector (1=primary care, 2=secondary care, 3=community, 4=interface, 5=mixed, 6=other, please say)

13. Group (1=general public, 2=patient group, 3=health professionals, 4=mixed, 5=other, please say)

Summary (write a short description of the methods and any reflections about them)

Proposal:

Report:

	Proposal	Report
II. CHARACTERISTICS		
1. General context of study (1=evaluation, 2=instrument development, 3=fieldwork and surveys, 4=needs assessment, 5=feasibility study)	pp	pp
2. All methods used (use more than one code if necessary) (1=interviews, 2=focus groups, 3=case studies, 4=ql observation, 5=documentary analysis, 6=conversation analysis, 7=ethnography, 8=survey, 9=routine data, 10=RCT, 11=other experimental design, 12=qn observational study, 13=economic costing; 14=other quantitative method)	pp	pp
3. Priority (1=mainly qualitative, 2=mainly quantitative, 3=equal, 4=uncertain) Explain why you drew this conclusion:	pp	pp
4. Role of qualitative (use more than one code if necessary) (1=develop the research question by (a) generating a hypothesis (b) establishing theoretical framework; 2=design instrument; 3= cognitively test instrument; 4= understand intervention by (a) developing it (b) seeing how it works, (c) seeing how it is used in practice (d) describing it; 5= describe outcomes and measures; 6= improve trial methodology; 7=aid scale construction; 8=explain underlying relationships in qn study; 9=explore unusual findings; 10=offer case illustrations; 11= confirm qn study 12=understand application of results in real world, 13=other)	pp	pp
5. Role of quantitative (use more than one code if necessary) (1=determining sample for ql, 2= generalisability, 3=test effectiveness, 4= describe, 5=explain variability)	pp	pp
6. Purpose of mixing methods (use more than one code if necessary) (1=confirmation, 2= complementarity, 3= expansion, 4= development, 5= initiation, 6= salvaging)	pp	pp
7. Purpose of the study (1=explanatory, 2=exploratory, 3=transformative, 4= does not fit these categories)	pp	pp
8. Number of phases (1=one, 2=two, 3=three)	pp	pp
9. Timing of methods (1=sequential, 2= concurrent)	pp	pp
10. Stage of study at which mixing occurs (1=design, 2=sampling, 3=analysis, 4=interpretation)	pp	pp
11. Type of integration		

<p>(1= criterion sampling, 2= extreme case sampling, 3= data conversion, 4= ql/qn analysis affects qn/ql analysis by typology, 5= ql and qn data sets create new variable (data consolidation), 6= integration of findings in results section as well as discussion, 7= integration of findings in discussion only, 8= integration of inferences from both ql and qn, 9= analysis of one method affects intervention, 10= analysis of one method affects outcomes used)</p>	pp	pp
<p>12. Levels of a study (1=one level, 2= multilevel)</p>	pp	pp
<p>13. Paradigms (1=positivism, 2= constructivism, 3= subtle realism, 4=emancipation, 999=missing)</p>	pp	pp
<p>III. TYPOLOGIES Please read the Coding Protocol before completing this to really familiarise yourself with the types</p>		
<p>1. Rossman & Wilson A. Applying typology 1 1= design corroboration 3= design elaboration 5= design development 7= design initiation 9 = unclassifiable</p>	<p>2=analysis corroboration 4= analysis elaboration 6= analysis development 8= Analysis initiation</p> <p>page</p>	page
<p>B. Ease of applying typology 1 to this study (1=easy, 2= some difficulties, 3=considerable difficulties) State reason for difficulty:</p>		
<p>2. Caracelli & Greene A. Applying typology 2 1=Component triangulation design 2=Component complementarity design 3=Component expansion design 4=Integrative iterative design 5=Integrative embedded or nested design 6=Integrative holistic design 7=Integrative transformative design 8=unclassifiable</p>	page	page
<p>B. Ease of applying typology 2 to this study (1=easy, 2= some difficulties, 3=considerable difficulties) State reason for difficulty:</p>		
<p>3. Creswell A. Applying typology 3 1 = Sequential explanatory design 2 = Sequential exploratory design 3 = Sequential transformative design 4= Concurrent triangulation strategy 5= Concurrent nested strategy</p>		

6= Concurrent transformative strategy 7= Unclassifiable	page	page
<u>B. Ease of applying typology 3 to this study</u> (1=easy, 2= some difficulties, 3=considerable difficulties) State reason for difficulty:		
<u>IV. Dissemination</u> Report structure (1= chapter per method, 2= results presented interwoven)	888	
<u>V. Proposal and report compared</u> Has there been any change between proposal and report? (1= no change, 2= small change, 3= loss of part of study, 888= cannot say because one part missing). Please describe any change.		
<u>VI. Any other comments</u>		

Coding form: Quality

(i) RESEARCH PROPOSAL

Availability of document (1= Available and obtained, 2= available but not obtained, 3= not available)				
	Yes/ No	Not enough info	Not applic	Please expand
<u>A. Individual methods</u>				
(i) QUANTITATIVE				
1. Is the role of the method clear?	pp			
2. Is the method appropriate for addressing the intended question?	pp			
3. Is the method described in sufficient detail, including sampling, data collection, and analysis?	pp			
4. Is the approach to sampling and analysis appropriate for its purpose?	pp			

5. Is the method sufficiently developed for its purpose?	pp			
6. Is the intended analysis sufficiently sophisticated?	pp			
7. Have issues of validity been addressed for the method?	pp			
8. Is there evidence that the rigour of the method has been compromised?	pp			
9. Is the method feasible in the time and money allocated?	pp			
10. Is there expertise amongst the applicants to supervise the method?	pp			
11. Will there be expertise on the team to undertake the method?	pp			
(ii) QUALITATIVE				
1. Is the role of the method clear?	pp			
2. Is the method appropriate for addressing the intended question?	pp			
3. Is the method described in sufficient detail, including sampling, data collection, and analysis?	pp			
4. Is the approach to sampling and analysis appropriate for its purpose?	pp			
5. Is the method sufficiently developed for its purpose?	pp			
6. Is the intended analysis sufficiently				

sophisticated?	pp			
7. Have issues of validity been addressed for the method?	pp			
8. Is there evidence that the rigour of the method has been compromised?	pp			
9. Is the method feasible in the time and money allocated?	pp			
10. Is there expertise amongst the applicants to supervise the method?	pp			
11. Will there be expertise on the team to undertake the method?	pp			
<u>B. Mixing methods</u>				
1. Is the use of mixed methods justified?	pp			
2. Is the rationale for mixing methods given? (i) Is the priority of each method stated? (<i>mainly quantitative, mainly qualitative, or equal status</i>)	pp			
(ii) Is the relationship between the methods stated? (<i>complementarity, confirmation, development</i>)	pp			
(iii) Is the sequence in which methods will be used stated? (<i>sequential or concurrent</i>)	pp			
(iv) Is the stage at which integration will take place stated? (<i>sampling, data collection, analysis, interpretation</i>)	pp			
3. Is the rationale clearly communicated?	pp			
4. Is the rationale appropriate for addressing the research questions?	pp			
5. Has the rigour of the mixed design been				

considered? For example, if confirmation is intended, are methods undertaken concurrently, with sufficient independence, and has blinding been considered?	pp			
6. Is the mixed methods design feasible? For example, in a sequential design, has enough time been given for Phase 1 to influence Phase 2 in the way intended?	pp			
7. Are paradigms discussed?	pp			
<u>C. Integration</u>				
1. Has any attention been given to integration?	pp			
2. Is the type of integration stated? (<i>results synthesis, data conversion, extreme case sampling, narrative</i>)	pp			
3. Is the type of integration appropriate to the design? For example, if the purpose of mixing methods is confirmation then the integration of findings rather than data is appropriate.	pp			
4. Is the approach to integration detailed in terms of working together as a team? (<i>segregation of team, congregation of team</i>)?	pp			
5. Are the personnel who participate in the integration identified? (<i>qualitative, quantitative, both together, whole research team, external stakeholders</i>)	pp			
6. Has enough time been allocated for integration, particularly the investigation of discrepant findings?	pp			
7. Has communication within the team been adequately timetabled?	pp			
8. Is there evidence of a willingness to respond to emerging results from one method?	pp			

<p>9. Does the dissemination strategy detail how the mixed methods will be reported in the final report and peer-reviewed publications? (<i>separate chapters or interwoven results</i>)</p>	pp			
<p><u>D. Success</u> 1. Have potential approaches to mixing and integration been fully exploited?</p>	pp			

E. Any other comments

(ii) COMPLETED REPORTS

Availability of document (1= Available and obtained, 2= available but not obtained, 3= not available)				
	Yes/ No	Not enough info	Not applic	Please expand
A. Individual methods				
(i) QUANTITATIVE				
1. Is the role of the method clear?	pp			
2. Is the method appropriate for addressing the research question?	pp			
3. Is the method described in sufficient detail, including sampling, data collection, and analysis?	pp			
4. Is the approach to sampling and analysis appropriate for its purpose?	pp			
5. Is the method sufficiently developed for its purpose?	pp			
6. Is the analysis sufficiently sophisticated?	pp			
7. Have issues of validity been addressed for the method?	pp			
8. Is there evidence that the rigour of the method has been compromised?	pp			
9. Were some methods planned but not executed?	pp			
10. Was there expertise amongst the authors in the method?				

	pp			
(ii) QUALITATIVE				
1. Is the role of the method clear?	pp			
2. Is the method appropriate for addressing the research question?	pp			
3. Is the method described in sufficient detail, including sampling, data collection, and analysis?	pp			
4. Is the approach to sampling and analysis appropriate for its purpose?	pp			
5. Is the method sufficiently developed for its purpose?	pp			
6. Is the analysis sufficiently sophisticated?	pp			
7. Have issues of validity been addressed for the method?	pp			
8. Is there evidence that the rigour of the method has been compromised?	pp			
9. Were some methods planned but not executed?	pp			
10. Was there expertise amongst the authors in the method?	pp			

<p><u>B. Mixing methods</u></p> <p>1. Is the use of mixed methods justified?</p>	pp			
<p>2. Is the rationale for mixing methods given?</p> <p>(i) Is the priority of each method stated? (<i>mainly quantitative, mainly qualitative, or equal status</i>)</p> <p>(ii) Is the relationship between the methods stated? (<i>complementarity, confirmation, development</i>)</p> <p>(iii) Is the sequence in which methods will be used stated? (<i>sequential or concurrent</i>)</p> <p>(iv) Is the stage at which integration will take place stated? (<i>sampling, data collection, analysis, interpretation</i>)</p>	pp			
<p>(ii) Is the relationship between the methods stated? (<i>complementarity, confirmation, development</i>)</p>	pp			
<p>(iii) Is the sequence in which methods will be used stated? (<i>sequential or concurrent</i>)</p>	pp			
<p>(iv) Is the stage at which integration will take place stated? (<i>sampling, data collection, analysis, interpretation</i>)</p>	pp			
<p>3. Is the rationale clearly communicated?</p>	pp			
<p>4. Is the rationale appropriate for addressing the research questions?</p>	pp			
<p>5. Is rigour adhered to for the rationale chosen? For example, if confirmation was intended, were methods undertaken concurrently, with sufficient independence, and was blinding considered?</p>	pp			
<p>6. Did the rationale work in practice?</p>	pp			
<p>7. Is the way in which the rationale worked in practice discussed?</p>	pp			
<p>8. Are paradigms discussed?</p>	pp			

C. Integration				
1. Has any attention been given to integration?	pp			
2. Is the type of integration stated? (<i>results synthesis, data conversion, extreme case sampling, narrative</i>)	pp			
3. Is the type of integration appropriate to the design? For example, if the purpose of mixing methods is confirmation then the integration of findings rather than data is appropriate.	pp			
4. Is rigour compromised in any way by the process of integration? (<i>segregation or congregation of team used appropriately, data transformations appropriate</i>)	pp			
5. Are the personnel who participated in the integration identified? (<i>qualitative, quantitative, both together, whole research team, external stakeholders</i>)	pp			
6. Did appropriate members of the team participate in integration?	pp			
7. Has attention been paid to the investigation of discrepant findings?	pp			
8. Has an intelligent approach been taken to considering convergent and divergent findings?	pp			
9. Is there evidence of communication within the team?	pp			
10. Is there evidence that one method has responded to emerging results from another method?	pp			
11. Are results of all methods considered				

sufficiently in the interpretation?	pp			
12. Is there clarity about which results have emerged from which methods?	pp			
13. Are inferences appropriate? That is, are the conclusions grounded in the data and consistent with the analysis?	pp			
<u>D. Success</u>				
1. Have both qualitative and quantitative parts been completed?	pp			
2. Have potential approaches to mixing and integration been fully exploited?	pp			
E. Any other comments				

(iii) PUBLICATIONS

Number of publications	
Name and year of journals where quantitative papers published	
Name and year of journals where qualitative papers published	
Name and year of journals where mixed methods papers published	
Description of strategy: 1. No publications 2. Only qualitative published (i) No reference made to other parts (ii) Reference made to other parts (iii) Influence of other parts explicit 3. Only quantitative published (i) No reference made to other parts (ii) Reference made to other parts (iii) Influence of other parts explicit 4. Both published separately (i) No reference made to other parts (ii) Reference made to other parts (iii) Influence of other parts explicit 5. Joint paper(s) (i) Separate sections in one paper (ii) Relationship and influence between parts explicit	
Any other comments	

Coding Protocol

Version 21.1.05

GENERAL

1. Please read the proposal and complete the sections on TYPE and QUALITY about the proposal. Then read the report and complete the sections on TYPE and QUALITY about report. Then compare both the proposal and report and identify any differences in methodology between the two. Finally, read the publications emerging from the study and complete the section about publications.
2. Record when information is missing (missing = 999) for any question or where it is not applicable=888.
3. Record page numbers where each item is discussed.
4. In the 'Type' section you may need to work out how the methods work together. Whether this is explicit or not is covered in the 'Quality' section.

TYPE

I. DESCRIPTION OF STUDY

1. **Start year** = year project was funded
2. **Length of project**= number of months project originally funded for
3. **Cost** = cost of project in £s
4. **Sector** = Community should include community in its widest sense e.g. schools, mental health establishments outside the sector of primary or secondary care.
5. **Availability of documentation**
1=both proposal and report, 2=proposal only, 3=report only, 4=report and publications, 4.1 summary report and pubs, 5=proposal, report and publications, 6=pubs only, 7= proposal and pubs
6. **No of universities**
If someone is at an organisation like a PCT which is not an university, count this as a university.

II. CHARACTERISTICS

1. Context

Think about the general thrust of the study. Instrument development may occur within an evaluation context. In this case, 'evaluation' is the code to be used.

1=evaluation, 1.1 formative, 1.2=explicitly summative, 1.3= impact, 1.4=formative and explicitly summative, 1.5 process and outcome, 1.6= realistic evaluation, 2=instrument development and testing, 3=fieldwork and surveys, 4=needs assessment, 5=feasibility study/ development work/preliminary evaluation, 6=explain variation, 7= find out something, investigate, understand

2. Methods used

Give a code to every method used. Add extra codes if necessary.

1=interviews, 2=focus groups, 3=case studies, 4= qualitative observation, 5=documentary analysis, 6=conversation analysis, 7=ethnography, 8=survey, 9=routine data/case notes, 10=RCT, 10.1 cluster rct, 11=before and after controlled, 12=qn observational study, 12.1 qn observational comparative, 13= economic costing; 14=organisational, 15= consensus method, 16=vignettes, 17=modelling, 18=time series, 19=DCE, 20= structured diary, 21= expert panel, 22=action research, 23=drawing, 24=screening

A survey can be postal, face-to-face, telephone.

3. Priority

Does one method supplement the other? This is a difficult issue to consider. One thought is to consider the size of the qualitative and quantitative methods but it is difficult to compare them. Consider the frequency and centrality of each approach to the study objectives. Consider whether there is an overall deductive (qn) or inductive drive to data collection (ql). Is the qualitative there simply to develop an instrument or does it have status in its own right? Given the difficulties around this, please explain why you drew this conclusion and difficulties faced.

4. Role of qualitative

Give a code to every role. Add extra codes if necessary.

1=develop the research question by (.1) generating a hypothesis (.2) establishing theoretical framework; 2=design instrument; 3= cognitively test instrument; 4= understand intervention by (.1) developing it (.2) seeing how it works, (.3) seeing how it is used in practice (.4) describing it; 4.5= pilot it, 5= describe outcomes and measures; 6= improve trial methodology; 7=aid scale construction; 8=explain underlying relationships in qn study; 9=explore unusual findings; 10=offer case illustrations; 11= confirm qn study 12=understand application of results in real world, 13= determine sample, 14=explore unusual groups already identified, 15=process evaluation, 16= understand an issue, 17=explore issues arising from qn, 18=uncover issues inaccessible to qn, 19= get depth information on complex or innovative cases, 19.1 highlight important issues to study, 19.2=give voice to users, 20=look at RCT as social construct, 21=look at service in practice, 22=acceptability of care, 22.1 test hypothesis, 23 validity of questionnaire, 24=user involvement.

5. Role of quantitative

Give a code to every role. Add extra codes if necessary.

1=determining sample for ql, 2= generalisability, 3= test effectiveness, 4= describe, 5= explain variation or relationship, 6=consensus, 7=measure outcomes, 8= psychometrically test, 9=provide topic guide for focus groups

6. Purpose of mixing methods

Give a code for every purpose. Add extra codes if necessary.

1=confirmation, 2= complementarity, 3= expansion, 4= development, 5= initiation, 6= salvaging,

7. Purpose of the study

Is the OVERALL purpose of the study to determine cause or effect (explanatory) or to explore an issue (exploratory) or to emancipate a marginalised group (transformative)? There may be a number of purposes but try to determine overall focus.

1=explanatory, 2=exploratory, 3=transformative, 4= does not fit these categories, 5= both explanatory and exploratory and cannot determine weight

8. Number of phases

Number of phases of study is to do with sequence of implementation. If data collection of one part of the study needs to happen before another stage can happen than this is two phases.

1=one, 2=two, 3=three

9. Timing of methods

Data collection of each part takes place in sequence (sequential) or at the same time (concurrent).

1=sequential, 2= concurrent, 3=iterative

10. Stage of study at which mixing occurs

1=design: analysis of ql/qn affects design of qn/ql e.g. affects the intervention or instruments

2=sampling: analysis of ql/qn affects sampling of qn/ql

3=analysis: data conversion may take place, or ql and qn data put side by side, or analysis of ql/qn affects analysis of qn/ql

4=interpretation: this is where the ql and qn findings are brought together for interpretation purposes

If nothing is explicitly stated then assume 4.

11. Type of integration

This may not be explicit but may be determined from plans and actions.

1= criterion sampling, 2= extreme case sampling, 3= data conversion, 4= ql/qn analysis affects qn/ql analysis by typology, 4.1 not by typology, 5= ql and qn data sets create new variable (data consolidation), 6= integration of findings in results section as well as discussion, 7= integration of findings in discussion only, 7.1=integration of findings unspecified, 8= integration of inferences from both ql and qn, 9= analysis of one method affects intervention, 10= analysis of one method affects outcomes measured or measures used, 11=results interpreted by other, 12=evidence from one supports evidence from other, 13= absolutely nothing, 14=qualitative analysis affect trial methodology

12. Levels of a study

Studies can be focused at the level of individuals or organisations. Is the focus of the study one of these levels or two of these levels?

13. Paradigms

A paradigm is a world view. Use more than one code if necessary and add extra codes. Is there a sense of a world view, even if it is not mentioned explicitly?

1= positivism, 2= constructivism, 3= subtle realism, 4= emancipatory research, 999=missing.

III TYPOLOGIES

There may be a number of relationships between methods. Specify them and then apply the typologies to all the relationships.

1. Rossman and Wilson

The typology is established around two phases of the research process. DESIGN is when the study is being planned, and ANALYSIS is when order is brought to the gathered data. Therefore, DESIGN codes will only be relevant to PROPOSALS and ANALYSIS codes will only be relevant to REPORTS.

The research purposes are:

CORROBORATION e.g. do perceptions of changes over time from interviews corroborate with changes determined using routine statistics.

ELABORATION where methods illuminate different facets of an issue or offer alternative perspectives. Data from one source extend, clarify, illuminate, help interpret data from another method.

DEVELOPMENT when results from one method are used to shape another method e.g. sampling, instrumentation, analysis strategies. The second method cannot be implemented without crucial information gleaned from the first. During the analysis phase, analysis of one method can shape the analysis of the next method.

INITIATION when the results from one method foster new lines of thinking, suggest alternative ways of posing the research question, and challenge the original conceptual framework of the study. Purposeful initiation at the design stage is difficult to predict but researchers can adopt a stance of openness and show that they are ready for divergent findings.

2. Caracelli and Greene

Designs are separated into COMPONENT designs where methods are implemented as discrete aspects of the study and remain separate until results are brought together in the conclusion; and INTEGRATIVE designs where a greater integration of different methods is attained.

In COMPONENT designs the purposes are

TRIANGULATION where different methods are used to assess the same phenomenon for convergence and increased validity.

COMPLEMENTARITY where results from one method are used to enhance or clarify the results from another *dominant* method.

EXPANSION where different methods address different aspects of an issue e.g. process and outcome evaluation. Results are offered in a side-by-side fashion.

In **INTEGRATIVE** designs the types are

ITERATIVE where results from one method inform the design of another (like development), or multiple iterations where there is movement back and forwards between data sets.

EMBEDDED or **NESTED** where one methodology is embedded in another, e.g. an ethnographic study with a small experiment within it.

HOLISTIC where methods are used simultaneously rather than taking turn, with an overall concept map e.g. a needs assessment

TRANSFORMATIVE where the rationale for mixing methods is ideological to represent pluralistic diverse views, e.g. participatory or action-research.

3. Creswell

Four aspects of mixed methods studies are covered: **IMPLEMENTATION SEQUENCE** of data collection, **PRIORITY** given to methods, stage of **INTEGRATION**, and **THEORETICAL PERSPECTIVE**.

SEQUENTIAL EXPLANATORY DESIGN where the study is mainly quantitative and the quantitative method is undertaken first. The qualitative study explains the quantitative study when unexpected results arise. Integration takes place at the interpretation stage. Methods can be equal partners.

SEQUENTIAL EXPLORATORY DESIGN where the study is mainly qualitative, with the qualitative method undertaken first. The quantitative study assists in interpretation of the qualitative study, particularly generalisation. Integration takes place at the interpretation stage.

SEQUENTIAL TRANSFORMATIVE DESIGN where there are two distinct phases of data collection, with integration at the interpretation stage. A theoretical perspective guides the study.

CONCURRENT TRIANGULATION STRATEGY where both methods are undertaken at the same time and corroboration between findings sought. The priority of each method is usually equal but there can be differing dominance. Integration is at the interpretation stage.

CONCURRENT NESTED STRATEGY where both methods are undertaken at the same time but a dominant method guides the project, with the lesser method embedded within. Mixing occurs during the analysis stage. Data collection is simultaneous and transformation of data is needed.

CONCURRENT TRANSFORMATIVE STRATEGY where both methods are undertaken at the same time but with a specific theoretical perspective.

4. Ease of application

If a type cannot be applied, please code this fact within each typology.

Ease of application is the ease you feel about the process of categorising the study. It concerns how easily you were able to come to a decision.

When giving a perception of the difficulty of applying type, please describe difficulties, including where the type was unclassifiable. Where there are clearly two types within a study, put these types on the coding form.

IV. Dissemination

Report structure (1= chapter per method, 2= results presented interwoven)

V. Proposal and report compared

Code whether there has been a change and then describe that change in free text.

1= no change

2= small change

3= loss of part of study

4= improvement in design

888= cannot say because one part missing

VI. Any other comments

Please make a note of any issue that came to mind while completing this form e.g. something is not being captured adequately by the form.

Quality

If you come across a question and your answer is 'I don't really know', please use the 'not enough information' category.

(i) RESEARCH PROPOSAL

A. Individual methods

Think about the quantitative methods first and then the qualitative methods

1. Is the role of each method clear? Without having to do much thinking, can you work out why each method is in the study?
2. Is each method appropriate for addressing the intended question? In particular, do you have any concerns that a qualitative method has been used to address a quantitative question or vice versa?
3. Is each method described in sufficient detail, including sampling, data collection, and analysis? Sufficient detail means that you could repeat the study yourself.
4. Is the approach to sampling and analysis appropriate for its purpose? For example, random sampling may be used in a qualitative study when purposive sampling may have been better.
5. Is each method sufficiently developed for its purpose? There is concern in mixed methods that some of the methods may be sketchily undertaken.
6. Is the intended analysis sufficiently sophisticated? There is concern in mixed methods that only very simple descriptive analysis is undertaken on data sets.

7. Have issues of validity been addressed for each method? Has due attention been paid to issues such as bias for quantitative methods and reflexivity for qualitative methods?

8. Is there evidence that the rigour of any method has been compromised? For example, is a survey undertaken on a qualitative sample, thus compromising the representativeness of the quantitative study?

9. Is each method feasible in the time and money allocated? For example, 20 interviews analysed in a week would not be feasible.

10. Is there expertise amongst the applicants to supervise each method? Is there someone with quantitative expertise and someone with qualitative expertise on the list of applicants?

11. Will there be expertise on the team to undertake each method? If an RCT is to be run, will a researcher be employed with appropriate expertise to analyse trial data?

B. Mixing methods

1. Is the use of mixed methods justified? That is, do the researchers discuss why both qualitative and quantitative methods are needed?

2. Is the rationale for mixing methods given? That is, do researchers **address** the issues below:

(i) Is the priority of each method stated? (*mainly quantitative, mainly qualitative, or equal status*)

(ii) Is the relationship between the methods stated? (*complementarity, confirmation, development*)

(iii) Is the sequence in which methods will be used stated? (*sequential, concurrent, or iterative*)

(iv) Is the stage at which integration will take place stated? (*sampling, data collection, analysis, interpretation*)

3. Is the rationale **clearly communicated**? Can you picture the way in which the methods interrelate e.g. is there a diagram of the design?

4. Is the rationale appropriate for addressing the research questions? If interviews are undertaken to determine the right outcomes for a trial but the interviews are undertaken alongside trial rather than before the trial, then this will be inappropriate.

5. Has the rigour of the mixed design been considered? For example, if confirmation is intended, are methods undertaken concurrently, with sufficient independence, and has blinding been considered?

6. Is the mixed methods design feasible? For example, in a sequential design, has enough time been given for Phase 1 to influence Phase 2 in the way intended?

7. Are paradigms discussed explicitly? Do the researchers state their paradigm or how paradigms might affect the study?

C. Integration

1. Has any attention been given to integration? Do the researchers discuss any way in which the two methods will be brought together in the study?
2. Is the type of integration stated? (*results synthesis, data conversion, extreme case sampling, narrative*)
3. Is the type of integration appropriate to the design? For example, if the purpose of mixing methods is confirmation then the integration of findings rather than data is appropriate.
4. Is the approach to integration detailed in terms of working together as a team (*segregation of team, congregation of team*)?
5. Are the personnel who participate in the integration identified? (*qualitative, quantitative, both together, whole research team, external stakeholders*)
6. Has enough time been allocated for integration, particularly the investigation of discrepant findings?
7. Has communication within the team been adequately timetabled?
8. Is there evidence of a willingness to respond to emerging results from one method?
9. Does the dissemination strategy detail how the mixed methods will be reported in the final report and peer-reviewed publications? (*separate chapters or interwoven results*)

D. Success

1. Have potential approaches to mixing and integration been fully exploited? Is there a sense of missed opportunity in the study, that the methods might have been used differently to produce more than intended? THIS IS EXTREMELY IMPORTANT – use free text to describe how more could have been made of this. Use ‘any other comments’ to go into detail if necessary.

E. Any other comments

(ii) COMPLETED REPORTS

A. Individual methods

Think about the quantitative methods first and then the qualitative methods

1. Is the role of each method clear? Without having to do much thinking, can you work out why each method was in the study?
2. Is each method appropriate for addressing the research question? In particular, do you have any concerns that a quantitative method has been used to address a qualitative question or vice versa?
3. Is each method described in sufficient detail, including sampling, data collection, and analysis? Sufficient detail means that you know exactly how the study was undertaken.

4. Is the approach to sampling and analysis appropriate for its purpose? For example, qualitative data may have been quantised and displayed in tables rather than analysed in depth.
5. Is each method sufficiently developed for its purpose? There is concern in mixed methods that some of the methods may be sketchily undertaken.
6. Is the analysis sufficiently sophisticated? There is concern in mixed methods that only very simple descriptive analysis is undertaken on data sets.
7. Have issues of validity been addressed for each method? Has due attention been paid to issues such as bias for quantitative methods and reflexivity for qualitative methods?
8. Is there evidence that the rigour of any method has been compromised?
9. Were some methods planned but not executed?
10. Was there expertise amongst the authors in each method?

B. Mixing methods

1. Is the use of mixed methods justified? That is, have researchers discussed why qualitative and quantitative methods are essential for the study?
2. Is the rationale for mixing methods given? That is, do the researchers detail the following:
 - (i) Is the priority of each method stated? (*mainly quantitative, mainly qualitative, or equal status*)
 - (ii) Is the relationship between the methods stated? (*complementarity, confirmation, development*)
 - (iii) Is the sequence in which methods will be used stated? (*sequential, concurrent, iterative*)
 - (iv) Is the stage at which integration will take place stated? (*sampling, data collection, analysis, interpretation*)
3. Is the rationale clearly communicated e.g. is there a diagram of the design. Is it clearly in the methods section or do you have come across it in a sentence in the discussion?
4. Is the rationale appropriate for addressing the research questions?
5. Is rigour adhered to for the rationale chosen? For example, if confirmation was intended, were methods undertaken concurrently, with sufficient independence, and was blinding considered?
6. Did the rationale work in practice? For example, if interviews were supposed to help develop a questionnaire then did this happen or were they not undertaken and analysed on time?
7. Is the way in which the rationale worked in practice discussed? For example, if interviews undertaken to design a questionnaire, was there detail given about how the researchers came together to do this and any challenges faced?

8. Are paradigms discussed?

C. Integration

1. Has any attention been given to integration? That is, bringing together the qualitative and quantitative methods?

2. Is the type of integration stated? (*results synthesis, data conversion, extreme case sampling, narrative*)

3. Is the type of integration appropriate to the design? For example, if the purpose of mixing methods is confirmation then the integration of findings rather than data is appropriate.

4. Is rigour compromised in any way by the process of integration? (*segregation or congregation of team used appropriately, data transformations appropriate*)

5. Are the personnel who participated in the integration identified? (*qualitative, quantitative, both together, whole research team, external stakeholders*)

6. Did appropriate members of the team participate in integration?

7. Has attention been paid to the investigation of discrepant findings? Sometimes there are differences between the qualitative and the quantitative findings. Consideration of this can result in further understanding.

8. Has an intelligent approach been taken to considering convergent and divergent findings? Have the researchers considered the strengths and weaknesses of different methods and what they are actually tapping into, to understand similarities and differences between findings?

9. Is there evidence of communication within the team? Have they met frequently or have qualitative and quantitative members met frequently about some aspects of the study?

10. Is there evidence that one method has responded to emerging results from another method? For example, qualitative methods might have revealed a lack of understanding of a concept used in the quantitative methods so caution can be exercised in the interpretation of that result.

11. Are results of all methods considered sufficiently in the interpretation? In a study which is 50:50 qualitative quantitative, is the discussion focussed mainly on either qualitative or quantitative findings?

12. Is there clarity about which results have emerged from which methods?

13. Are inferences appropriate? That is, are the conclusions grounded in the data and consistent with the analysis?

D. Success

1. Have both qualitative and quantitative parts been completed?

2. Have potential approaches to mixing and integration been fully exploited? Detail in free text how this potential might have been gained.

E. Any other comments

(iii) PUBLICATIONS

Write down the names and year of journal for each paper for quantitative papers, qualitative papers and mixed methods papers.

Put zero if the study has been completed for one year or more and the lead researcher has said that there are none.

Put 'non- too early' if the study is in progress or has been completed within one year of date received (October 2004).

Code the type of publications:

1. No publications
2. Only qualitative published
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
3. Only quantitative published
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
4. Both published separately
 - (i) No reference made to other parts
 - (ii) Reference made to other parts
 - (iii) Influence of other parts explicit
5. Joint paper(s)
 - (i) Separate sections in one paper
 - (ii) Relationship and influence between parts explicit
6. Systematic review or lit review only

Any other comments

Definitions

Sequential – one method is completed prior to another.

Concurrent – methods are undertaken at the same time.

Complementarity – each method addresses a different question/aspect.

Confirmation – two methods address the same question for corroboration.

Development – one method aids the sampling or instrument construction of another.

Data conversion – qualitative concepts are counted and analysed quantitatively (quantitised) or quantitative analyses are considered as concepts (qualitised).

Integration – the quantitative and qualitative aspects of the study are considered together.

Request for interview

Dear [name of researcher]

Developing mixed methods in health services research: request for an interview

I have been funded by the Medical Research Council (MRC) to study the development of mixed methods in health services research. As part of this process I would like to interview researchers who have participated in studies making use of both qualitative and quantitative methods. I have identified a number of relevant mixed methods studies and note that you were a member of the team on [name of study]. I would very much like to talk to you about your experiences of this study and any other mixed methods studies you have participated in.

My aim is to explore the issues facing researchers implementing these types of studies, in order to help our research community gain the maximum potential of this approach. I would like to interview you alone, for approximately one hour, in your workplace.

If you are interested, I have enclosed an information sheet about the interviews, and an informed consent form. Would it be possible for you to read these and return the informed consent in the envelope provided? If you agree to be interviewed I will then telephone you to make arrangements.

If you have any queries then please email me on a.ocathain@sheffield.ac.uk or call me on (0114) 222 0770, which is a direct line.

Thank you for considering this request.

Yours sincerely

Alicia O’Cathain
MRC Fellow

Information sheet and consent form for interviewees

Study title

Developing mixed methods in health services research.

Invitation

You are being invited to take part in a research study. Before you decide, it is important for you to understand the research and what it will involve. Please read this information carefully and take your time deciding whether to take part.

What is the purpose of the study?

Mixed methods studies, where qualitative and quantitative methods are used in a single study, are a relatively new design in health services research. I want to explore the facilitators and barriers to implementing these studies in practice. I am interviewing about 25 researchers who have participated in mixed methods studies.

Why have you been chosen?

I want to interview a range of researchers and I chose your name from researchers who have been funded to undertake mixed methods studies through any of the following funding sources: HTA, SDO, NEAT, National R&D programmes, and the Department of Health Policy Research Programme.

Do you have to take part?

It is up to you whether or not to take part. You are free to withdraw at any time and without giving a reason.

What will happen to you if you take part?

I will telephone you to arrange a convenient time and place to meet. The interview will take about one hour. I will tape record the interview with your permission.

What are the possible risks and benefits of taking part?

You may be concerned that either you or your research projects will be identifiable to my wider research team or in any publications. The interviews will be confidential and I will not share your name with anyone either within or outside my research team. Two people will listen to the tape - myself and a transcriber who will not be given your name. I will study the transcripts, and other members of the research team will have access to anonymised transcripts only. I will not name researchers, projects or universities included in the research in any verbal or written communications, including team meetings. The findings will be reported in an anonymised way. I will send you an anonymised version of the transcript and you can indicate tracts which you would prefer were not used as verbatim quotes within any report, journal article or conference presentation. If I have not received a response within a month I will assume that all of the transcript of your interview is suitable for quotation.

Will your taking part in this study be kept confidential?

I will not inform anyone, including my research team, of the identities of participants. I will however inform them of the characteristics of participants. All information you give me will be kept strictly confidential.

What will happen to the results of the study?

The results will be published in a report to the Medical Research Council, my PhD thesis, and publications in peer-reviewed journals. I will not identify research studies or interviewees within these publications and I will guard against the recognition of studies or researchers.

Who is organising and funding the research?

The study is being funded by the Medical Research Council as part of an MRC Fellowship. I am based in the Medical Care Research Unit with supervisors from the Universities of Sheffield and Nottingham.

Ethical approval

Ethics approval from a NHS ethics committee is not necessary because participants in the research are not included in their capacity of patients or health professionals. However, the study has been assessed by the Ethics Committee at the School of Health and Related Research at the University of Sheffield, and I am taking ethical issues around confidentiality and anonymity seriously.

Contact for further information

Please do not hesitate to contact Alicia O’Cathain for further details. My direct line is (0114) 222 0770.

What should you do if you want to take part?

If you wish to take part, you can keep this information sheet, and complete the informed consent form and send it to me in the envelope provided.

What should you do if you prefer not to take part?

If you do not wish to take part it would help me if you could tick the relevant box on the consent form below and return it to me in the envelope provided. This will help me to know that my request was received.

Thank you for taking time to read this.

3/10/05 version 5

Developing mixed methods in health services research

Consent form

I agree to be interviewed by Alicia O’Cathain

Name _____

Contact telephone number _____

I prefer not to be interviewed

Name _____

Thank you for responding. Please detach the consent form from the information sheet and send it to me in the envelope provided.

Developing Mixed Methods in Health Services Research: Topic guide

1. Can I ask about your background? I'd like to know how you got into research and progressed to your current position.

2. What label would you use to describe yourself in the research context?

Prompt qualitative researcher, epidemiologist, mixed methodologist, health services researcher

3. I'm here to talk to you because of your involvement in a mixed methods study [STUDY A]. But before that I'd like to get an idea of your involvement in other mixed methods studies.

- a. Have you been involved in other mixed method studies?
 - a. If no, focus these questions on STUDY A
 - b. If yes, include STUDY A in these questions
- b. Can you describe them with a focus on the combinations of methods used
- c. How did your involvement in mixed methods studies come about?
 - a. Enthusiast or just find yourself doing it?
- d. Looking back at your experience can you tell me about the aspects of these studies
 - a. which worked well
 - b. which did not work well or were challenging
- e. Were they good mixed methods studies (rather than good studies)?
- f. Pick up on definitions of mixed methods used

4. Focusing on [STUDY A],

- a. How did the team come together for the study?
 - b. How did the team work together?
 - c. Did you feel you fully exploited mixing methods?
 - d. Any specific questions to do with the study _____
-
-

5. Thinking about mixed methods more generally,

- a. what do you think are the challenges facing mixed methods currently?

Prompt: expertise
 paradigms
 funding
 team work
 status of methods
 dissemination

- b. Do you think we are maximising the benefits of mixed methods studies?

6. Are there any researchers you think I should include in my interviews?

7. Is there anything else you want to say?

8. What is the message you'd like me to really take away today?

9. What would you like to see coming out of this study?

List of codes produced by WinMax

The codes are in alphabetical order, as displayed in WinMax.

<p>climate damage description of project environment career path ethics committees funding bodies journals word count local reviewers expertise/experience contract staff expertise in qual knowing forms of integration learning gap identity/researcher discipline phd qual/quant risk taking transdisciplinary message mixed methods challenges ability [6:100] being clear doing battle planning time value definition dissemination conferences etc exploited</p>	<p>integration discrepancy intangible triangulation personal position teams/communication both camps conflict geography hierarchy history integrated moves on why/why not people centred written about it nature of HSR complexity contracts health economics hierarchy medical dominance policy applied research practical qualitative research depth of qual paradigms quality respect serendipity</p>
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Integration grid of studies in quantitative documentary analysis where interviews were undertaken

ID	Status*	Yield**	Knowledge	Expertise	Planning	Valuing mm and int/motivation	Damage and contam	Team	Respect	Luck	Hierarchy	System	Paradigms	Climate
1	C	Y 5.2	Yes	Yes Mixed bag	Yes	Yes. Int was motivation	Fears of damage to trial but show by action that not true	Close and friendly	Yes	Lucky to have found good people and funding	PI values interdisciplinary work	Publishing was a struggle. Career path a problem	Exciting and works between them – different heads needed	Better
2	C	Y 5.2	---	Yes	-	Qual= people's view. Does not value integration really, but mm. Paper was strategic	-	The lead researcher is the team	Yes	Lucky to do research	Is PI and values mixed methods	-	No problem. Has found space.	Better for qual. Local is good.
3	C	Y 4.3	Has learnt on job and wants to learn more	No qual expertise on team but CR worked hard at it	-	Integration important.	-	Integrated QI and qn same dept	Yes	Lucky to have job	PI and grantholders valued qual, junior qI	Time Ethics committees	-	-
4	C	Yb 4.3	Developing through experience of doing it	Yes. Developing expertise in mixing but calls this 'jack of all trades'	They didnt plan properly for this one but learnt as they went. Will plan for next one.	Values integrated working practices and sees them as together	-	Integrated team. PI foot in both camps Geographically close.	In early days clinicians + HEs did not respect qual but learnt to and use it now	Lucky to have good team.	RCT is gold standard but qual has growing respect. Is PI and values integrated team.	Journals make publishing mm difficult. Top journals take quant.	Yes different paradigms but likes that, see benefits in it	Work environment set up for this type of work Climate changing to be positive to qual
5	C	Yb 4.3	Wants to know more	No problem even though junior staff with no expertise	Qual was not planned	PI didn't want qual, funder did. Also sees value in additive.	PI concerned about RCT	Qual was a junior team member Geographically close. QI did qn and qI.	PI did not respect qual but other senior people did	Needed this to get the qual funded and published	Low status of qual researcher	Reviewers got the qI funded and published	Did not understand them for this study but does now	Dept is changing to having more quals in it
6	C	Yb 0	Yes	Yes inc mixed	Says people dont plan for integration	The question, so not strategic	-	Worked well together. Separate but PI not involved in either – just overall. PI had	Yes	-	PI into qual and quant and had foot in both camps	Funding bodies dont give time for integration.	Not an issue. Need to get job done.	Qual dominance

								foot in both camps				People aren't trained in both so can't ask the right questions		
7	C	N 4.2	Said 'I don't know about this'	Yes	Forced together by the funders	Values mm but they thrown together by funder so did not think about integration. Satisficing.	-	Qn and ql geographically separate - 2 teams - but said worked well together	Yes because people choose to work together	-	Both qual and quant were PIs	Education needed	Not really an issue, exciting to work together	Changes in what is acceptable
8	C	N 5.2 but poor	Yes. Triangulation	Expert ql but left to contract researcher	Planned but medical dominance	Triangulation	-	CR left to do it PI not into mm Geographically close	Not for ql	Lucky to have bosses into ql	Medical dominance and no value of mm	Medics	Pragmatic	Changing for better
9	C	N 3.1	This is a problem - knowing what you can do	Having expertise in combining may have helped QI expertise on the team, although I disagree	Planning may have helped	Values mm but does not really know about integration	-	Small team in same geography helped to share findings	There is respect within the team but not with all ql researchers outside the team	-	Not PI but had a lot of influence over what went on, esp the qn	Time, resources, contract research and publication	QI and qn here shared paradigms	Works in a dept where it is the done thing to do mixed methods.
10	C	N 3.3	Did not know any better then but knows now how to do it properly	No ql expertise in applicants	Planned without integration	Valued mm as part of good quality study but had no knowledge of integration	-	No ql expertise on the team	Lacked respect for co-applicants	-	PI but did not understand importance of ql expertise at that stage	-	-	Old ways rule
11	C	N 3.2	Learnt how to do these things, skills developing, implying poor knowledge at this stage	Yes	Never clear about what the ql would really do - 'a notion'	There was no valuing of ql in the Steering Group. Motivation was to get funding?	Clinicians saw it as a threat	Dysfunctional Steering Group and team which just did their own bits. Very multidisciplinary	Big problem of no respect for qual or researcher	-	No one supported the ql. HSR methods hierarchy of qn rules	Big journals not into ql or mixed methods	Problem	Dept aided multidisciplinary research Climate changing towards more communication in teams
12	C	N 3.2	QI not planned	CR left and senior qual not	QI not planned but	Sees value in additive	Yes	PI and junior ql	Yes	-	Quant PI and unspoken team	-	Need to share them in team	Need to justify why not mm

				tied in	added later	question ql can address		Geographically close			dynamics?			
13	C	N 3.2	--	Yes	-	Valued mm	--	Friendly. Geographically close	Yes	-	QI was deputy lead to qn PI	--	-	--
14	C	N 2.2	Yes	Where was qn expertise?	--	Satisfying. Could not do the ql study planned due to participants.	-	PI in charge of ql and qn but CR did not perform	--	--	PI Research environment	Time allocated in applied research	Not an issue because did not integrate	--
15	O	Y Integration	Aware of some ways but feels like an amateur	Yes	-	Inspired by previous experience of integrated work	Protects qn from ql damage	Close team of ql and qn. Close geography. History good. Integrated by PI doing ql too	Yes	--	PI qn but involved with ql	--	No problem	Past experience of mm affects current practice - does mm
16	O	YB Qual invisible because qn protocol sent	Says gaps but has a lot of knowledge	Has low expertise RAs but expertise in applicants	No int planned for	Values int for some studies but for this one motivation was strategic	-	Two separate teams in different geographical locations - ql and qn	Yes	--	Qn dominance	High impact factor drives publications Facilitates doing mm not integration.	Into paradigms	Dept does mm
17	O	YB Good parts but no integration	--	Yes	--	Previous team. Separate ql and qn parts	PI fears effect of ql	Integrated. History Separate places for ql and qn	Yes but other researcher says not	--	Quant PI	--	--	Built on previous good experience
18	O	YB Good.	--	Yes	Planned joint paper	NK	--	Integrated	Yes	--	There is none	--	--	--
			Triangulation	Yes	Planned joint paper	Strategic-funders like mixed.	--	Integrated but not enough for this researcher	Some but not for qn	--	QI is main part.	Funders force ql and qn together	Does not respect qn	--
19	O	YB Good	--	Yes. All round researcher	--	Natural to do mm. Integration is	--	Integrated Same place, with	Yes	--	QI and qn PIs	Ethics committees like qn	Not an issue	"we do mm"

20	O	N but innovative design	Junior researcher taking the bulk of the study	Pulling in stats expertise. Her qual expertise is not high	Unclear how int would happen but it is planned for	fine. No idea what motivated use of mm because junior.	--	history Two separate teams in different geographical locations with ql mainly in one team but sharing of data collection	Yes. Although judges ql with qn eye	--	Has to wait for PI to say what is next yet.	Rgov and ethics mean running out of time	Aware. Works at this within herself because does qn and ql	Young researchers not into old paradigm wars
21	O	N Poor	--	Yes	--	Wants ql and qn to be mutually supportive. Questions drive it.	--	Team for ql and team for qn in different places	--	--	There is a PI for ql and PI for qn	Complex environment for research	Good quality ql needed rather than description	--

* C= complete, O=ongoing

** Y, YB, N =assessment of yield for reports of completed studies and proposals for ongoing studies. 0-5.2 indicates types of publication