

Sequential multiple methods as a contemporary method in learning disability nursing practice research

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Abstract

This paper explores and advocates the use of sequential multiple methods as a contemporary strategy for undertaking research. Sequential multiple methods involve the use of results obtained through one data collection method to determine the direction and implementation of subsequent stages of a research project (Morse, 1991; Morgan, 1998). This paper will also explore the significance of how triangulating research at the epistemological, theoretical and methodological levels could enhance research. Finally the paper evaluates the significance of sequential multiple method in learning disability nursing research practice.

Keywords

research methods, sequential multiple method, learning disability nursing research

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Introduction

This paper will explore the use of sequential multiple method. This was originally used within a UK wide research project investigating how community learning disability nurses

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perceived and enacted their public health roles (Mafuba, 2012) and is used within this paper to contextualise the use of the sequential method. This study adopted 3-stages; the first was the exploratory stage, which involved examining job descriptions; documentary analysis. In the second stage UK learning disability nurse consultants were interviewed and transcripts were carefully analyzed using grounded theory. The third stage; the explanatory stage, involved a UK survey of community learning disability nurses. The use of multiple methods in a single study has existed for some time in social research (Campbell and Fiske, 1959; Erzberger and Prein, 1997); and recently there has been growth in multiple-method research studies (Green et al., 2001) including nursing. The extent and value of multiple methods in nursing research have been highlighted (Halcomb and Andrew, 2005). However, very little attention has been paid to highlight the potential of sequential multiple methods in nursing research. This paper seeks to make a contribution to the research literature to address this absence of methodological and theoretical interest particularly in learning disability nursing research.

Definitional issues

Multi-method, mixed methods, multiple methods and triangulation refer to the concurrent or sequential use of more than one approach in a study at the methodological level (Barbour, 1998; Byrne and Humble, 2006; Creswell, 2009; Denzin, 1962; Morse, 2003; Treddle and Tashakkori, 2003). However, to fully benefit from the potential of multiple-method designs, integration needs to be at the epistemological, theoretical and methodological levels. In this article, the term *multiple methods* is used in a context of the study design (Shih, 1998), and triangulation is used in the context of the process of implementing a multiple-method design research study (Thurmond, 2001).

Cosmology, ontology and epistemology

To fully realise the potential of sequential multiple-method study designs, the connectedness of and interaction between cosmology, ontology, epistemology and methodology in the generation of new knowledge (Crotty, 1998) need to be understood. Cosmology refers to one's worldview and in essence this influences how a researcher approaches a study design. Cosmology directly influences one's ontology, or the claims, and assumptions the researcher makes regarding the nature of social realities, assumptions about what exists, and what that existence looks like, and how what exists interacts with each other (Blaikie, 2000). It is important that every researcher clarifies and is conscious of his or her underlying philosophical position in order to fully appreciate the potential of sequential multiple-method research designs. In designing a sequential multiple-method study, understanding the epistemology is crucial in ensuring that the rules of correct knowledge creation and belief formation are explicit (Breachin and Sidell, 2000) in the phenomenon under investigation. Potential users of sequential multiple-method study designs will find the works of Guba and Lincoln (2005), Geertz (1988) and Eisner (1999) useful in locating their epistemological positions within the current contradictions in order to design sequential multi-epistemological studies.

Sequential Multiple Methods QUAL → quan Notation (Morse 2003)				
Epistemological Continuum				
	Stage 1 (Exploratory phase)	Stage 2 (Descriptive phase)	Stage 3 (Explanatory phase)	
Theoretical Perspective	Interpretivist	Interpretivist	Positivist	
Methodology	Documentary	Grounded Theory	Survey	
Methods	Method	Documentary analysis	Semi-structured interview	Online survey questionnaire
	Participants	Job descriptions Person specifications	Learning Disability Nurse Consultants Other Senior NHS Nurses in LD Practice	Community Learning Disability Nurses
	Sampling	Purposive (Glasser & Strauss)	Purposive + Theoretical	Non-proportional quota
	Data Analysis	Content / Thematic Nvivo 8	Constant Comparative / Thematic Nvivo 9	Descriptive / Inferential Statistics SPSS19

Figure 1. Example of a three-stage sequential multiple method research study design (based on Crotty, 1998 and Morse, 2003).

Types of triangulation

There are six types of triangulation that could be used in sequential multiple-method study designs (theoretical, methodological, data source, multiple, investigator, and analysis). Theoretical, methodological and data source triangulation appear to be the most commonly used in nursing studies, and these are considered here (Begley, 1996; Foss and Effelsen, 2002; Thurmond, 2001). One reason for the lack of literature on the interaction between cosmology, ontology and epistemology, and how these positions could be reconciled in study designs could be that researchers thus far may consider it more important to maintain their positions at these theoretical levels.

Theoretical triangulation. It is the use of multiple theories or hypotheses to investigate a phenomenon (Corner, 1991; Cowman, 1993; Denzin, 1970; Kimchi et al., 1991; Nolan and Behi, 1995; Shih, 1998). Denzin (1970) and Banik (1993) further explained that theoretical triangulation looks at testing opposite theories. The process of theoretical triangulation could involve the same data set or different data sets (Boyd 2000). In the example given here, different data sets were triangulated. In this approach, the researcher needs to pre-empt and address the possibility of non-convergence of data.

According to Burns and Grove (1993), theoretical triangulation could result in poor studies if the rationale for using it is not clearly defined at the beginning of the project. It is therefore

important to conceptualise from the diagram how the overall design fits together and at different levels (see Figure 1). Furthermore, researchers need to be cognizant that analysing data and interpreting results from data collected using quantitative and qualitative methods in a study could be difficult (Banik 1993). It is therefore important that adequate controls are put in place. Sequential multiple methods could provide effective controls in that each stage of the study is treated as an independent study in its own right. This makes it possible for the theoretical drive of each stage to be clarified without ambiguity. This is important because it makes it easier to clarify a study's epistemological position. This is also important as Lincoln and Guba (1985) have further pointed out that triangulation could be epistemologically faulty if this is not clarified at the beginning of a study. It is therefore important that research undertaken using multiple methods is clearly located on the epistemological continuum. They also noted that findings could be difficult to interpret if the underlying constructs and concepts are the same or overlap (Lincoln and Guba, 1985).

Methodological triangulation. It is more complex and confusing (Goodwin and Goodwin, 1984). The main confusion seems to arise when it is used to describe triangulation at either the design or data collection levels (Cowman, 1993; Goodwin and Goodwin, 1984; Kimchi et al., 1991; Lincoln and Guba, 1985; Morse, 1991; Shih, 1998). In addition to discussing methodological triangulation from study design and data collection perspectives, it is also further divided into within-method triangulation and between- or across-method triangulation. In the within-method approach, at least two data collection strategies (both qualitative or both quantitative) from the same paradigm are used in studying the same phenomenon (Begley, 1996; Kimchi et al., 1991; Nolan and Behi, 1995; Thurmond, 2001). On the other hand the across-method approach uses a mixture of qualitative and quantitative strategies to measure the same variable (Denzin, 1970; Kimchi et al., 1991; Mitchell, 1986; Nolan and Behi, 1995; Thurmond, 2001).

The purpose of qualitative and quantitative studies is basically similar in that all research intent to gather evidence or generate new knowledge. The existing debate is how evidence of a particular phenomenon is gathered or how knowledge is created. It could therefore be argued that combining methods within the same paradigm is possible and sensible in order to have a clearer picture of a phenomenon from qualitative and quantitative data (Dzurec and Abraham, 1993; Lincoln and Guba 2000). It could be argued that research that reconciles interpretative and positivist worldviews is useful in presenting a more holistic view of a phenomenon. Another attraction of methodological triangulation is that it has the potential to compensate for the weaknesses of one method with the strengths of the other (Corner, 1991; Morgan, 1998; Morse, 1991; Thurmond, 2001). According to Morse (1991), this is particularly useful when combining interviews or focus group data with survey data.

Methodological triangulation is not without its limitations, and it is important for researchers to be aware of these criticisms throughout the research process. Some critics have argued that qualitative and quantitative approaches differ fundamentally at the ontological and epistemological levels and because of this it is impossible to combine the two in one study at the methodological level (Dzurec and Abraham, 1993). However, this could be addressed by ensuring that each method is rigorous and robust enough to be sustainable on its own (Morse, 1991). It is also important that researchers be aware of the warning made by Fielding and Fielding (1986) that data error from one approach could not be compensated by accuracies in another approach.

Data source triangulation. This refers to the use of multiple sources of data to explore the same phenomena (Begley, 1996; Cowman, 1993; Kimchi et al., 1991; Nolan and Behi, 1995; Shih, 1998). In addition, the triangulation of data can be in the context of time (Denzin, 1970; Kimchi et al., 1991), place (Kimchi et al., 1991; Mitchell, 1986) and person/participant (Denzin, 1970; Kimchi et al., 1991). In the context of the research given in the article, time and place were not of interest, and therefore these are not explored any further here. In data source triangulation in the context of participants, data are collected from more than one level of people involved in the phenomenon under consideration (Denzin, 1970; Kimchi et al., 1991). Triangulating data at the participant level present a number of benefits in sequential multiple-method study designs. Banik (1993) highlighted the significance of increasing the volume of data, which is enabled by the process of triangulation. In addition, according to Fielding and Fielding (1986), triangulating the source of data in the context of the participants has the potential to enhance the confidence levels in the data. Improving the confidence levels is important in any study, whether it is qualitative or quantitative. In the example given here, job descriptions and person specifications were used to explore how public health policy was interpreted and translated into job roles by employers. This was not only useful in the exploration of the phenomenon under consideration but was also useful in the theoretical sensitisation of the researcher. In the descriptive phase of the study learning disability nurse consultants and others were interviewed to explore further the findings from the exploratory phase of the study. In this stage, a mid-range hypothesis was generated. In the explanatory phase of the study, a wider and larger group of community learning disability nurses was surveyed using an online questionnaire in order to explain the correlations in the hypothesis generated in stage 2 of the study. The large volume of data collected was useful in enhancing the confidence in the data and therefore the findings.

Data triangulation is not without challenges. It is very likely that a large amount of data would be generated, which would be essential in enhancing the confidence levels, handling, analysing and interpreting large amounts of data have the potential for errors, resulting in wrong interpretation of the findings (Porter, 1989; Thurmond, 2001).

Sequential multiple methods

This approach is invaluable in that it allows the researcher to make adjustments and refine each subsequent stage following the findings from the preceding stage.

A clearer understanding of the value of sequential multiple methods in learning disability nursing practice can be further aided by the work of Breechin and Sidell (2000). They created a three-lens framework of 'knowing', which could be useful in articulating and operationalising this complex but very valuable approach to research. The three lenses overlap, overarch and represent different windows through which the world could be viewed (Breechin and Sidell, 2000). The authors have argued that how researchers choose a lens or multiple lenses in looking at a phenomenon is dependent on the motivation for seeking evidence or knowledge. The fact that these lenses could be used sequentially fits very well with sequential multiple-method study design. Applying the first lens to a multiple-method design such as in the example here is useful in looking at the importance of how capacity for prediction and control (positivist) could be improved. This approach is important in building capacity in the exploratory phase, which would improve the generalisability of the findings in the explanatory phase of a study and the knowledge that emerges. In the example under consideration here, stage 3 employed the use of a survey questionnaire to verify the themes that emerged from

stages 1 and 2. It was therefore necessary that in stage 3 of this study that it had to be located within a deductive positivist approach to test the theories that emerged in stages 1 and 2.

The second lenses enable the researcher to focus on developing an understanding and exploration of meanings (Brechin and Sidell, 2000). In brief, stages 1 and 2 were devoted to theoretical sensitisation and theory generation (Glaser and Strauss, 1967; Layder, 1993). This is important since Parahoo (2006) has noted that most theories emerge from what is already known. According to Glaser and Strauss (1967), theory generation is crucial in creating new knowledge. They argued for the need for inductive research to be seen as a preliminary stage in a project, and they saw this process as more capable of producing relevant propositions. They further argued that the findings obtained through the inductive process need to be tested quantitatively later. What is perhaps even more important for researchers learning disability nursing practice is their positivist stance that prediction and control are important in explaining observed behaviour (Glaser and Strauss, 1967). Simply, this explains a view that a sequential multiple-method approach to nursing research is useful and important in generating new and relevant knowledge.

The third lens suggests that research could be viewed as a method of promoting social values (Brechin and Sidell, 2000). Lairumbi et al. (2008) have argued that research needs to make contributions to the values of the society in which it is undertaken. This is important for researchers to understand because translating research into policy and practice is difficult and complex (Lavis, 2006). The implication of this being that research that is undertaken ethically, and which promotes society's social values is more likely to inform, and influence policy, and practice. In the example given here, the research undertaken here involved how community learning disability nurses enacted their public health roles in implementing public health policy for people with learning disabilities. It could be argued that this research has significant social value.

As mentioned earlier, the example given here is of a 3-stage exploratory, descriptive and explanatory study. The design involved qualitative and quantitative projects, which are relatively complete in their own right. Creswell (2009) provides a very useful checklist of 12 items that could be used during the process of a multiple-method study design.

Sequential implementation can be exploratory or explanatory (Creswell, 2009). In an *explanatory sequential multiple-method research design*, quantitative data are collected and analysed before qualitative data are collected in order to contextualise the statistical data (Byrne and Humble, 2006). On the other hand, in an *exploratory sequential multiple-method research design*, qualitative data are collected in order to explore a phenomenon or phenomena, and then quantitative data are collected with the aim of explaining the relationships observed in the exploratory phase of the research (Byrne and Humble, 2006). The example given here is the latter (see Figure 1 above). This design has predominantly an inductive theoretical drive and has a QUAL → quant notation (Creswell, 2009; Morse, 2003). This means that the predominant components of the study were qualitative. It is important to point out that the notation of a sequential multiple-method study design needs to be dictated by the question under consideration.

Strengths of sequential multiple methods

Sequential multiple methods need to be approached from a position that it is impossible for one research method to be able to provide a holistic view of complex phenomena (Cowman, 1993; Denzin, 1989; Sandelowski, 2000) and this is often common in learning disability nursing

research. The use of sequential multiple methods is therefore essential in order to capture the context and social complexities associated with experience and perception studies (Hammersley and Atkinson, 1995; Sayer, 1992; Shih, 1998). In addition, triangulation increases validity, strength, and interpretative potential of a research study and reduces investigator biases (Denzin, 1970). Campbell and Fiske (1959) who are credited with introducing multiple methods noted that triangulation enhanced validity through data confirmation. In addition, multiple methods are considered to be useful in shedding light on the phenomenon under investigation from different viewpoints (Coyle and Williams, 2000; Fielding and Fielding, 1986). Furthermore, the point raised by Halcomb and Andrew (2005, p.73) that triangulation at the epistemological level provides a '*completeness of understanding*' of the phenomenon and consideration is rational and reasoned. Holman (1993) also noted that qualitative and quantitative methods complement each other in health care studies. The literature cited here suggests that using sequential multiple-method approaches is more likely to generate valid and reliable knowledge than a single method approach.

Weaknesses of sequential multiple methods

Perhaps the greatest potential weakness of sequential method is incompatibility of different cosmological, ontological, and epistemological positions, which researchers and consumers of research may hold. Questions and contentions over validity of multiple-method research contribute to the perceived weakness of sequential multiple-method studies. Findings from sequential multiple methods could be difficult to locate within the traditional objectivist or objectivist positions. Researchers' and consumers' worldviews are important because they influence acceptance or rejection of research findings. In addition, these incompatible worldviews make it difficult to integrate the results from a study (Onwuegbuzie and Johnson, 2006). Furthermore, the findings from sequential multiple-method study may be difficult to compare with the findings from other studies on the same phenomenon (Onwuegbuzie and Johnson, 2006).

What is also clear from current literature is the lack of a framework, and the limited amount of information regarding how sequential multiple-method studies could be implemented (Corner, 1991). Existing literature shows that in many cases triangulation is used to increase the volume of data, without consideration of how data would enhance validity, reliability, or rigour of the results (Begley, 1996; Thurmond, 2001).

Another important drawback of using sequential multiple method is the complexity and extent of the work involved at every stage. Researchers need to be aware that putting a theoretically driven sequential multiple method study design together is challenging in itself, and requires meticulous attention to detail at every stage of the research process.

Careful consideration needs to be made to ensure that a study can demonstrate integrity and coherence all the way from the epistemological drive, right down to data interpretation and writing up of research findings. A good example of what I am referring to is that the study being discussed here employed three different methodologies, and all these had to be considered in their own right resulting in the need for three separate sections on methods, and three separate sections on results during reporting.

Another important drawback of sequential multiple methods is that it is resource intensive in terms of expense, time and researcher skills (Nolan and Behi, 1995; Shih, 1998; Thurmond, 2001). Conducting face-to-face interviews could be expensive in transport and subsistence terms if participants are spread across a wide geographical area. Sequential multiple-method studies could take a long time to implement, and could become unmanageable if they are not carefully planned.

In terms of researcher skills sequential multiple methods could be quite challenging (Thurmond, 2001). In the example given, the researcher had to develop sufficient depth of knowledge of three methodologies, three methods, two sampling methods, three data analysis methods, and three different types of data analysis software. Another potential disadvantage of triangulation is that because of the extent of the work involved, there is likely to be a limit placed on the depth of error and bias checking for each of the procedures (Begley, 1996; Nolan and Behi, 1995). Another potential difficulty, which needs to be considered carefully from the beginning, is what route a researcher would have to take in the event that findings are completely divergent (Proctor, 1998). Divergent results are likely to present problems with their interpretation. This may in turn impact on the value of the contribution to evidence or knowledge by a research study. To address this problem, each of the stages could be designed as an independent study in its own right with integration occurring in the discussion section of the reporting stage. This would allow the results to be reported separately even if they fail to converge. The second contingency would involve adopting a stance to synthesise the potential sources of the lack of convergence (Chelsea, 1992).

Conclusion

This article has explored the relevance of and highlighted how a sequential multiple-method study design could be used in learning disability nursing practice research. It is essential that more researchers adopt sequential multiple-method study designs and report on their experiences in order to build a good evidence base for such an underused but effective approach to research.

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