

Article Title: Rethinking Variant Models of Embedded Research design within a qualitative dominant Mixed Method study

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Abstract

This paper presents a critical review of current variant models of the Embedded Design and further advances the discussion by presenting other possible variants of embedding quantitative data sets in predominant qualitative research design. Qualitative and quantitative research paradigms have dominated the world of social science research due to philosophical world views that play divisive roles between the two. The onset of mixed method research provides a bridge between them with the purpose of enhancing, confirming, disconfirming or validating results of a single study. Embedded design is a mixed method design where one data set provides a supportive, secondary role in a study primarily based on the other data type. Literature subscribes to the fact that qualitatively driven or qualitative dominant mixed methods studies best capture the complexity of major educational and social issues. However, reported works in this area is limited showing a gap in literature on the need to embed quantitative data within predominately qualitative studies. In this paper the authors present other variant models beyond phenomenology. The authors associate themselves with the inevitable circumstance of embedding quantitative data within the big five qualitative designs; case study, ethnography, phenomenology, grounded theory and biography. The authors present a strong case of reasons for embedding quantitative data within a qualitative studies for purposes of testing an emerging theory , mapping out participants and for generalization of qualitative findings.

Key Words: Mixed Methods Research, Embedded Design, Embedded Design Variants

Introduction

Mixed method is a research strategy where the researcher collects, analyzes data, integrates findings and draws inferences using both qualitative and quantitative approaches and methods in a single study or program of inquiry, (Tashakkori & Creswell in Papadimitriou, 2013). Mixing quantitative and qualitative components in a larger study can achieve various purposes, including generating more complete data, corroborating findings and using results from one approach to enhance insights attained with the complementary method, (Curry et al 2009). Approaches to mixed methods studies differ on the basis of the timing in which the components occur, the emphasis given to each (Creswell & Clark 2007 in Curry et al 2009) and how they will be integrated or mixed, (Creswell et al 2010). In Timing, the qualitative and quantitative components may be performed concurrently or sequentially; emphasis may be placed either on qualitative or quantitative component or equal weight given to both whereas mixing or integrating could be of three different forms of data either merging data, connecting data, and embedding data, (Creswell et al 2010). Creswell and Plano Clark (2007) proposed four main mixed method design types with multiple variants based on emphasis and purpose, three of these mixed method designs (Embedded, Triangulation and Exploratory) include a qualitative dominant design component with variants, in which emphasis is placed on the qualitative and the constructivist-interpretive mental model, (Creswell and Clark's 2007).

The embedded design is a mixed method design where one data set provides a supportive, secondary role in a study primarily based on the other data type (Creswell et al. 2003). This design is used when researchers need to include qualitative or quantitative data to answer a research question within a largely quantitative or qualitative study. The Embedded Design mixes the different data sets at the design level, with one type of data being embedded within a methodology framed by the other data type (Caracelli & Greene in Creswell 2006). A key question with embedded designs is whether the secondary data type is playing a supplemental role, that is would the results of the secondary data type be meaningful if it were not embedded within the

other data (Creswell and Plano Clark, 2007). Researchers collect both quantitative and qualitative data either sequentially or concurrently with one form of data playing a supporting role. Sequentially, the quantitative data may play a supporting role within a phenomenology or grounded theory study while concurrently; the qualitative and quantitative data play a supportive role in a case study, ethnography, narrative, or other qualitative research design. The concurrent (as one-phase embedded designs) or sequential (two phase embedded designs) and the quantitative and qualitative data are used to answer different research questions within the study, (Creswell, 2007). In the case of concurrent, data is collected during the same time frame, even though independently from each other. The collected data has unequal weight in one-phase embedded designs. Sequential data collection involves different stages. The data is first collected (and then analyzed, in a qualitative form (as in two-phase embedded designs). Decisions are then made about how the results (either quantitative or qualitative) will be used to influence the following data collection (either qualitative or quantitative). Finally, a second and complementary phase of data collection and analysis, builds on the first one. In two-phase embedded designs, quantitative data collection is always more weighted than qualitative one.

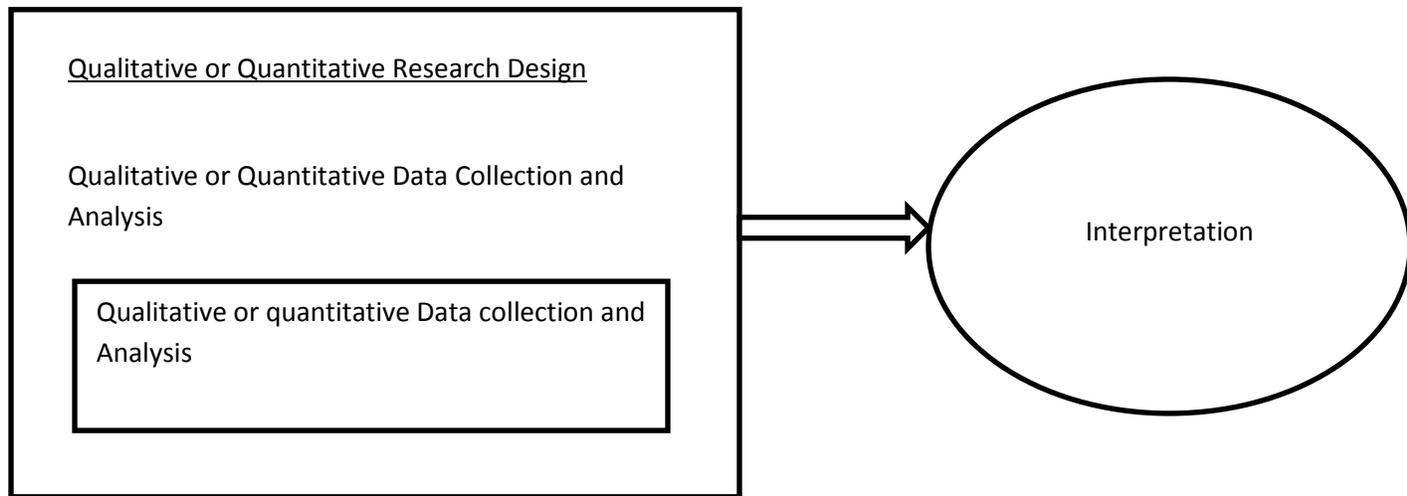
According to (Creswell, Plano Clark, in Creswell 2007) One phase approach is oftenly referred to as a concurrent nested mixed methods design. The concurrent nested design data may be used to serve a variety of purposes. To gain broader perspectives from using the different methods as opposed to using the predominant method alone. For example, a primarily qualitative design could embed some quantitative data to enrich the description of the sample participants while qualitative data could be used to describe an aspect of a quantitative study that cannot be quantified while sequential qualitative or quantitative information may be used before the intervention, to shape the intervention, to develop an instrument, or to select participants, or after the intervention, to explain the results of the intervention or to follow up on the experiences of participants with certain types of outcomes, (Creswell 2007) and quantitative information

may be used after to generalize the findings or testing a hypothesis or theory that has developed.

The variant model of embedded qualitative dominant

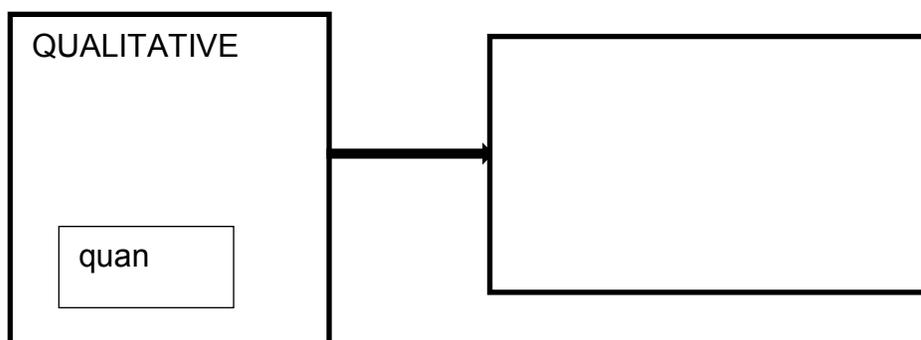
The Qualitative dominant MMR is where quantitative data could be embedded within a primarily qualitative methodology/ design (i.e. a grounded theory, case study, ethnography, narrative research).The predominant method guides the project. Embedded or nested models make use of different approaches at the design, data collection and analysis levels, with one type of data embedded within the other set. In one variant, the quantitative data are secondary to the qualitative and the interpretation is qualitatively led (Lieberman, 2005).A quantitative and qualitative data collection within a qualitative procedure is displayed in figure 1.

Figure 1: embedded design



Source: authors

In the QUAL+quan designs the qualitative data set or methodology assumes the primary role while quantitative data set becomes secondary or supportive to qualitative. This is shown in figure 2; QUAL (QUALITATIVE) is primary (dominant) methodology while quan (quantitative) is less dominant.



Source; Authors (2015)

Notations For embedded design data collection strategy and priority(sequential and concurrent), produce the following notations according to Johnson and Onwuegbuzie, in Olatz & Jose.(n.d)Simultaneous/ concurrent is either QUAL+quan. Sequential: its either: QUAL→quan; quan→QUAL. According to Creswell, (2008), the concurrent embedded variant with Qualitative emphasis notation is QUAL+quan while for sequential it is either quan-QUAL, or QUAL (quan),hence within qualitative dominant mixed methods research, the researcher would begin with the predominant qualitative stage and continue with the complementary quantitative stage (QUAL(quan), (Morse, 2003 in Tashakkori & C. Teddlie (Eds).In this design, a quantitative strand/phase is embedded within a predominantly qualitative study (quan + QUAL). QUAL and QUAN approaches are used to “confirm, cross-validate, or corroborate findings within a single study”, (Creswell, Plano Clark, Gutmann, & Hanson, 2003). The embedded qualitative dominant mixed methods design emphasizes qualitative multi method for exploration and verification. Similarly a primarily qualitative design could embed some quantitative data to enrich the description of the sample participants. Qualitatively driven or

qualitative dominant mixed methods studies are best able to capture the complexity of some educational and social issues, (Creswell, Shope, Plano, Clark, & Green, 2006). For example, a study by Daly et al. (2009) offered the closest example of an embedded methodology design in their examination of the value of improvisation training for service employees while the qualitative case study method was the overarching design used in this study, both qualitative and quantitative data were collected simultaneously, then analyzed and mixed in the results (Robert and Timothy, 2011). The qualitative dominant embedded design has the following variants; mixed methods case studies, mixed methods narrative/biography research, mixed methods ethnography, mixed methods Grounded Theory and mixed methods Phenomenology.

Embedded Case Study Variant

According to Yin in Baxter & Jack (2008), a case study design should be considered when: the focus of the study is to answer “how” and “why” questions; cannot manipulate the behavior of those involved in the study; want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or when the boundaries are not clear between the phenomenon and context. A case study is a common approach in social sciences and education (Rule and John 2011). Multiple definitions and interpretations of this research method can be found in the literature and based on the underlying philosophical assumptions of the researcher; case study research can be applied in both the interpretivist and positivist research paradigms (Maree in Villiers & 2015). An embedded case study methodology provides a means of integrating quantitative and qualitative methods into a single research study (Scholz & Tietje, 2002; Yin 2003). Embedded case studies involve more than one unit, or object, of analysis and usually are not limited to qualitative analysis alone. The embedded case study design is an empirical form of inquiry appropriate for descriptive studies, where the goal is to describe the features, context, and process of a phenomenon. The embedded case design allows for both qualitative and quantitative data and strategies of synthesis or knowledge integration. The methods of knowledge integration help explain the data

under consideration, thereby making data and inferential processes more transparent (Creswell, 2007).

The Embedded case study approach is particularly relevant to the examination of an environment where the boundaries between the phenomenon of interest and context are not clearly evident. In embedded case study, qualitative data about the individual is collected through in-depth interviews from the individual or detailed document review and analysis while quantitative data is obtained from segments of the community with knowledge of the person. The two data sets are analyzed and interpreted to give an in depth understanding of the character under study For instance, a study explored the shared story of successful Spanish learning at three high schools in the heart of the Midwest. An embedded multiple case study approach was utilized, with teachers/classrooms nested in buildings/communities, to allow the exploration of student success within a socially contextualized structure, (Moeller, Theiler, & Wu, in Theiler2012).

Embedded Narrative/Biography Variant

An embedded narrative is a story within a story. It hinges contextually on the framing narrative while typically becoming the bulk of the story. This therefore means that the embedded narrative occupies majority of the text while the framing narrative occupies just first and last few pages. Clandinin (2013) posits that consideration for narrative researchers is attending to the way stories of experience are embedded within social, cultural, linguistic and institutional narratives hence narrative inquiry must always extend beyond the personal and attend to the social and cultural context in which stories are told. The strengths of narrative embedment is to create aesthetic, brings out unusual facts and interest to the reader.

Embedded Grounded Theory Variant

According to (Creswell, 2014), grounded theory is a design from sociology in which a researcher derives a general abstract theory of a process or interactions grounded in

the views of the participants. This theory involves multiple stages of data collection and the refinement and interactions of categories of information.

Grounded theory is a research methodology primarily associated with qualitative research, it was first proposed by Barney Glaser and Anselm Strauss in 1967. According to its founders, grounded theory constitutes an innovative methodology, facilitating the discovery of theory from data. This implies that in grounded theory the researcher is not focused on testing hypotheses taken from existing theoretical frameworks, but rather develops a new 'theory' grounded in empirical data collected in the field. As such, these data are deliberately privileged above existing theoretical concepts (Dunne, 2010).

Johnson, McGowan, and Turner (2010), conceptualized a mixed methods version of grounded theory demonstrating that Grounded theory can be tailored to work well in any of the 3 major forms of mixed methods research (i.e., qualitative dominant, equal status, and quantitative dominant). For example, Rothertetal (1990) identified four groups of women on the basis of their responses to eight scenarios concerning hormone replacement therapy. That is, they created a typology of information use that showed how differently people can respond to the same sets of information, and that these differences could be clustered in ways that distinguished women from each other. After they quantitatively identified these groups, they interviewed three women from each of these groups for further clarification and to confirm their typology. This kind of investigation lends itself especially well to subsequent grounded theory study, as the clusters can provide the basis for theoretical sampling and for typology development. Researchers can then validate these groupings with further qualitative study or quantitative study.

Embedded Phenomenology Variant

Phenomenological research is a qualitative-based design. The main emphasis of phenomenological research is to describe or to interpret human experience as lived by

the experience in a way that can be used as a source of qualitative evidence. Due to its distinct strengths in terms of describing or interpreting the nature of lived experience, phenomenology is the ideal method for experiential work within an interpretive paradigm. However, despite its clear assets as a method, phenomenology fails to address the social context of lived experience (Langridge & Ahern, 2003); furthermore, although phenomenology can help generate structures of lived experience, it is not suitable for making generalizations about such structures on its own. Hence, the scientific nature of the phenomenological method offers areas of methodological compatibility with more deductive approaches that help justify the adoption of an MMPR approach by researchers, (Mayoh & Onwuegbuzie, 2013). According to Garza (2007) in Mayoh & Onwuegbuzie, (2013), the flexibility of phenomenological research and the adaptability of its methods to ever widening arcs of inquiry is one of its greatest strengths. Therefore, despite its long philosophical tradition, the phenomenological method is one that is can still be adapted to incorporate (or be incorporated within) emerging movements within the field of Mixed method research methods.

Johnson, Onwuegbuzie, and Turner (2007) proposed that there are three major types of mixed methods studies: Equal-status mixed research, wherein equal prominence is given to both the qualitative and quantitative components; qualitative dominant mixed research, wherein priority is given to the qualitative element (in this case phenomenology); and quantitative dominant mixed research, wherein priority is given to the quantitative element (in this case the complementary method). The focus of the article is however the qualitative dominant mixed research, wherein priority is given to the qualitative element (in this case phenomenology);Hence embedded models in phenomenology include; quan-PHEN allows for orientation and development, PHEN+quan facilitates hypothesis testing,

Quantitative–PHENOMENOLOGY (quan–PHEN).

Research that moves from qualitative to quantitative is more common within mixed methods research, however the reverse sequencing (i.e., quan- PHEN) has been a

more popular approach for qualitatively driven mixed method research (Mayoh & Onwuegbuzie, 2013). Within quan-PHEN studies, preliminary quantitative findings are used to inform the phenomenological focus within the second phase of the research. Therefore, the quantitative data provide orientation toward the phenomena that are uncovered within the preliminary quantitative phase, or alternatively help identify participants for the phenomenological phase can provide information rich experiential accounts (Mayoh & Onwuegbuzie, 2013). Quantitative research methods are included within the broader qualitative framework to meet the aims of the phenomenological tradition and provide orientation, broader reflecting the mixed methods purpose of development (Greene et al., 1989). Conversely, Mayoh et al. (2012) used a preliminary quantitative phase to orientate a study with a dominant descriptive phenomenological second stage. They argued that all forms of phenomenology require an element of orientation to ensure that the most relevant and interesting phenomenon is selected for phenomenological research. **Quan-PHEN**, methods are combined for the purpose of development as outlined by Greene et al. (1989), which seeks to use the results of one method to help inform another: to increase the validity of constructs and inquiry results by capitalizing on inherent method strengths. In this case, the strength of quantitative research (identifying common aspects of a phenomenon) is used within a phenomenological framework to provide orientation and focus to a study where the phenomenological method is dominant. For example, in a study Thornton et al. (2011) combined a preliminary stage consisting of a quantitative self-report assessment with a proceeding phase of phenomenological inquiry drawing on interpretive phenomenological analysis. Similarly, in their 2011 study of rural workers' experiences of back pain, Dean et al. used a preliminary questionnaire prior to a phase of interpretative phenomenological analysis, (Mayoh & Onwuegbuzie, 2015).

Phenomenology-quantitative (PHEN!quan).

Mixed methods research that moves sequentially between qualitative and quantitative methods carries great potential as qualitative methods naturally set the stage for quantitative research, (Robbins & Vandree, 2009). A further potential model for MMPR is one based on the concurrent nested approach to mixed methods research designs (Creswell, Plano & Clark, 2010; Leech & Onwuegbuzie, 2009). Concurrent mixed methods research can prioritize the qualitative or quantitative method; within this model, phenomenological and quantitative data are collected concurrently in order to cross-validate or to confirm findings. For instance, Robbins and Vandree (2009) described using a qualitatively driven sequential multistrand mixed methods research design (Teddlie & Tashakkori, 2006) within their study of suppressed laughter (PHEN!quan). They used dialogical phenomenological findings from the initial phase of the research to inform an experimental study in order to test the hypotheses that had emerged from the earlier phenomenological data. Specifically, the first phase of Robbins and Vandree's study uncovered the social nature of the phenomenon of suppressed laughter, which led to the researchers including "the presence of a friend" as an experimental variable in the second phase of the study. This study provides an example of MMPR being conducted for the purpose of expansion (Greene et al., 1989). This model allows for a level of breadth as well as depth of data to be achieved within a single study, and can help improve the utility and generalizability of phenomenological findings.

For example, during their research into mothering occupations, Winston et al. (2010) collected data from mothers concurrently using the Parental Stress Scale, Life Satisfaction Index for Parents, and phenomenological interviews. They adopted a descriptive phenomenological approach that used member checks, where participants' transcripts were reviewed by the participants themselves to ensure that they reflected their personal experiences, thereby increasing descriptive validity.

Conclusion

Research that draws on the strengths of both quantitative and qualitative approaches has become increasingly recognized as essential in a number of fields. The present report introduces qualitatively embedded variants for the potential for understanding the social phenomenon. Qualitative embedded research studies renders otherwise qualitative findings possibility for generalizations. A more complete answer to a research question or a set of research questions can be achieved by integrating quantitative methods in a qualitative study. This means that there are gaps that cannot be comprehensively answered by one method which the other can answer. It is also paramount in gaining a broader perspective from using the different methods as opposed to using the predominant method alone. Different data sets captured using embedded qualitative strategies enhances transferability, generalizability of findings which would otherwise not be possible in qualitative designs alone One data set complements the other either at the design, identification of participants, during the process to explore on an issue or at the end to justify a new theory.

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