Mixed methods workshop notes

Pat Bazeley, Research Support P/L, www.researchsupport.com.au

Definitions

Multimethod and mixed method

Mixed methods is generally used as a generic term to include both mixed and multimethod research. Multimethod research occurs when different approaches or methods are used in parallel or sequence but are not integrated until inferences are being made. *Mixed methods research involves the use of more than one approach or method for research design, data collection or data analysis within a single program of study, with integration of the different approaches or methods occurring during the program of study, and not just at its concluding point.*

Integration of methods was usefully referred to by Morse & Niehaus (2009) as the point of interface between the methods.

> *Integration can be said to occur to the extent that different data elements and various strategies for analysis of those elements are combined throughout a study in such a way as to become interdependent in reaching a common theoretical or research goal, thereby producing findings that are greater than the sum of the parts. (Bazeley, 2010a: 432)*

This approach to integration recognizes "the reality that there can be many different 'mixes' or combinations of methods" (Yin, 2006: 41) and rejects a clear differentiation between 'qualitative' and 'quantitative' methods or approaches to research (Bergman, 2008). *Quantitative* and *qualitative* are seen to describe poles on a multidimensional continuum rather than distinct entities, with any study (including most monomethod studies) being located at varying points along those various dimensions (i.e., rarely is one study located at or near one or other pole on all dimensions). Methods being integrated are not limited to those traditionally designated as qualitative or quantitative, but can include also visual approaches, geographic information systems, and/or social network analysis, for example.

History

Interest in and debates about mixed methods research date back to the multi-trait–multi-method measurement strategies of Campbell and Fiske (1959), which were designed to ensure that differences in measurement of psychological variables reflected true differences rather than measurement error; the (mis)application of the surveyors' concept of triangulation to methods of social investigation by Webb et al. (1966); Denzin's (1978) development and popularization of that concept; and the distinction drawn between qualitative (naturalistic) and quantitative (rationalistic) approaches to research by Lincoln and Guba (1985). Anthropologists and sociologists (particularly those from the Chicago school) had, however, been actively employing multimethod strategies in community settings throughout the last century, often more implicitly than explicitly. The combination of multiple or mixed methods 'has a long standing history' also in evaluation research where both formative and summative aspects of a program were considered (Rallis & Rossman, 2003).

Mixing methods has more recently gained recognition as a third methodological movement (Johnson & Onweugbuzie, 2004; Teddlie & Tashakkori, 2009), with interest in mixed methods research increasing dramatically during the past decade. There are now a number of specialist methodological journals devoted to or actively fostering mixed methods research (JMMR; IJMRA, and some disciplinary based ones), and Sage has recently published the second edition of the *Handbook of Mixed Methods Research for the Social and Behavioral Sciences* (Tashakkori & Teddlie, 2010).

Paradigmatic debates and mental models

Fuelled by the publication of Lincoln and Guba's various works, there was considerable debate around the issue of whether research methods that were based on different paradigmatic (philosophical – ontological and epistemological) assumptions could be combined within a single study. This is because approaches taken to defining "qualitative" and "quantitative" were associated with different paradigmatic approaches to research—different assumptions about the nature of reality (ontology) and the means of generating it (epistemology). Because one can't research or prove paradigms and paradigmatic debates can never be resolved, there was a shift in emphasis during the 1990s to the more tractable issues of design and methods and features of the knowledge claims that can be advanced through mixing methods (Greene & Caracelli, 1997).

Pragmatism has increasingly overruled purity (Morgan, 2007; Rossman & Wilson, 1985) as the perceived benefits of mixing methods in "getting research done" came to be seen as outweighing the importance of the philosophical difficulties in their use: "The question, then, is not whether the two sorts of data and associated methods can be linked during study design, but whether it should be done, how it will be done, and for what purposes" (Miles & Huberman, 1994: 41). Various approaches to realism (primarily critical realism), in which ontological reality is combined with (more-or-less) constructivist epistemology, are also providing a paradigmatic foundation for many mixed methods researchers, particularly where the goal is to develop explanatory or causal models (e.g., Maxwell, 2004; Maxwell & Mittapali, 2010; Pawson, 2008).

In her more recent book, Greene (2007) reviewed the history of the paradigmatic debates and argues for paradigmatic diversity, depending on study purpose. She suggested that it is more useful to think in terms of how our mental models influence what we do. "The core meaning of mixing methods in social inquiry is to invite multiple mental models into the same inquiry space for purposes of respectful conversation, dialogue, and learning one from the other, toward a collective generation of better understanding of the phenomena being studied" (Greene, 2007: 17).

Purpose and design for mixed methods

Research designs for mixed methods studies have generally been divided into two main groups:

- component designs, where each of the component methods retains methodological separation and integrity, and
- integrated designs, where there is an interplay of methods throughout the project.

Different designs serve different purposes (Caracelli & Greene, 1997). Thus:

- Two methods, conducted concurrently but separately, used for corroboration/validation of findings (usually referred to as triangulation);
- Different methods combined (either sequentially or concurrently) to complete or enhance a picture, or elaborate or strengthen a result (referred to as triangulation, complementarity or expansion);
- Methods used sequentially so that the first informs the design or analysis of the second (development);
- Different methods (and paradigms) deliberately chosen to spark off each other in a dialectical stance designed to generate fresh ideas (initiation).

Taxonomies of research design have been outlined also by Morse (2003), Creswell & Plano Clark (2010), and Teddlie & Tashakkori (2009), among others. While these can be useful in outlining a range of possibilities, no taxonomy can completely capture the degree of variation which occurs in 'real world' research. Maxwell and Loomis (2003) avoided the use of typological systems altogether for describing research designs, preferring to approach design interactively, that is, to "treat the design of a study as

consisting of the actual components of a study and the ways in which these components connect with and influence one another" (p.245). Their 5 components of design—purpose, conceptual framework, research questions, methods and validity—are linked in a web of relationships with the research questions being central (Figure 1).

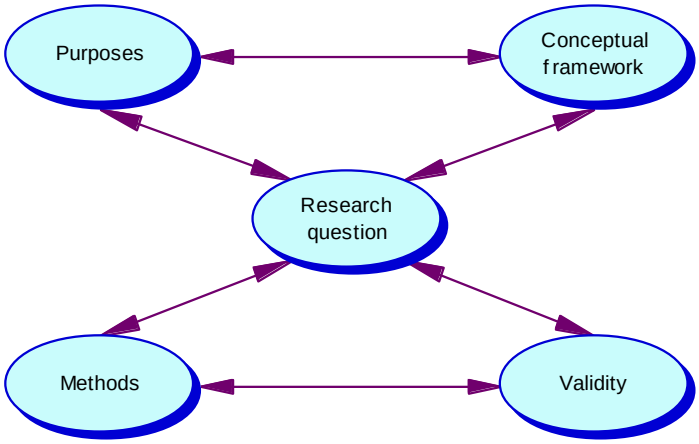

Figure 1: Maxwell & Loomis' (2003) interactive model

In Maxwell and Loomis' model, each component must be put together, in one of multiple ways, to make a coherent whole. "Uncovering the actual integration of qualitative and quantitative approaches in any particular study is a considerably more complex undertaking than simply classifying the study into a particular category on the basis of a few broad dimensions or characteristics. It requires an understanding of each of the five components of the study's design and of the ways in which each component incorporates quantitative elements, qualitative elements, or both. In addition [...] it is important to examine the actual conduct of the study [the methods in use] rather than simply depending on the author's assertions about the design" (p. 256).

On a practical level, because of the likely (and potentially confusing) mix of methods you will be using, it is extremely useful to set out a table in which you list the questions you are asking, and what, of the data sources you are proposing to use, will provide the data to help you answer each question. Add an additional column that shows how you propose to analyse that data, and perhaps another to list the resources you will need to gather and analyse the data. Sometimes it is useful to also set out the table 'the other way around', so that you list each data item, how you propose to use it, and the questions each is designed to answer.

Strategies for integrating analyses

Using different data sources in a complementary way

Different data sources may be analysed separately and then be brought together and integrated in the final stages of analysis and then in writing up results, e.g., where data from one method fills out, completes, or extends information from the other. In such cases, it is important that the sources are combined before or during writing, rather than being separately reported (the latter no longer constitutes mixed methods), and any opportunities for combining data sources earlier should be taken (Bazeley 2010b).

Combining data types for synthesis, comparative or pattern analysis

Data are often gathered and recorded only on a group basis, yet where there is the possibility of finer-level matching of data (e.g., for individual cases), there exists opportunity for a fine-tuned synthesis or comparison, or even blending of different forms of data.

The use of a tabular layout (such as is provided by Excel), referred to variously as a matrix or metamatrix (Happ et al., 2006; Miles & Huberman, 1994), is a way to bring together varied data sources (regardless of data type) for particular cases or groups of cases. Data may benefit from being transformed to a common type, but this is not essential (e.g., Excel can be used with both numbers and text). Columns are used for the various types or content elements of information; rows define the cases (individuals or groups sharing a common feature). Analysis involves looking for associations between different elements of the data (reading across the rows), or building a composite picture based on combinations of information.

Placement of data into a common matrix, spreadsheet or database allows for more than synthesis. Making comparisons is a basic strategy for analysis in almost any method. Comparisons facilitate a variety of outcomes, including identification of subgroup characteristics; showing the behavioural or ideational correlates of scaled scores; showing the pattern of relationships between different constructs or variables; discernment of new dimensions within or related to a concept; validation of scale scores; and identification of outlier or deviant cases for further analysis.

The most straightforward form of comparative or pattern analysis is when some aspect of the qualitative data is compared for demographic or other categorically or numerically defined subgroups of the sample. Although this can be done simply on a group average basis, ideally the analysis is based on data that was entered and therefore linked across individual cases, with the cases then sorted to reveal any patterns and discrepancies in the associated data. Even with a small sample, use of demographic or standardised scaled information can help to place in context what is said by a participant.

Use of computer programs that allow for combination of variable and coded data to generate matrix output (e.g., NVivo and MAX) greatly facilitate these types of analysis.

Transforming data during analysis

Conversion or transformation of data from text to numbers (quantitising) is more common than from numbers to text (qualitising).

Qualitising numeric data

Qualitative profiling derived from numeric data can be based

- on the modal or average features of a group, or its range of variability;
- on component characteristics, derived through cluster or factor analysis.

Quantitising qualitative data

Transformation of data from verbal responses to numeric codes might take place at any of a number of points during the research process, including (a) during data collection by field staff, (b) categorising open ended responses in preparation for analysis, (c) conversion of qualitative codes to variable data during analysis, and (d) transformation after analysis when results are being synthesised (Louis, 1982).

Counting themes, or instances of a category in a qualitative database, constitutes a very simple form of conversion of data from textual to numeric form (Sandelowski, 2001). Additionally, when subgroups are compared, the resulting analyses provide not only an assessment of the qualitative differences in the

coded text between the groups, but also a count of the number of members in each group coded for each concept compared.

Whether one should use counts of the number of participants who mention something or the overall frequency with which something is mentioned depends on the context in which counts are being obtained and used and the possible meanings of a zero (0) count in that context (Bazeley, 2010a). Similarly, the specificity of what is being counted impacts on meaning and use of counts, for example, whether it includes any reference to occupational stress as an issue, or just negative experiences of occupational stress. Other problems which can occur when counting on the basis of qualitative coding relate to the use of percentages for small samples, relying on numbers to tell the whole story, and not providing sufficient context to allow the reader to properly interpret the numbers (Bazeley, 2010a; Sandelowski et al., 2009).

- Quantitising may be designed to allow the researcher to merge and/or compare data, e.g., by taking quantitised open ended response data back into a statistical database for analysis along with other numeric data; or to facilitate comparisons being made using a spreadsheet.
- Quantitising of qualitative data is also employed for exploration, prediction and explanation.

Data is usually transferred from a qualitative database to a quantitative one by creating a case-by-variable table, where the variables are presence or absence of codes. Other formats might involve the creation of cross tabulations or similarity tables. Cluster analysis, multidimensional scaling (MDS), correspondence analysis and factor analysis are some of the exploratory techniques that have been applied to the resulting data matrices to generate meta-themes, core dimensions or comparative analyses (Bazeley, 2006; 2010a). Additionally, new or consolidated variables or data sets might be constructed from a combination of qualitative and quantitative sources for use in further analyses.

One of the critical advantages of data that has been quantitised from qualitative coding is that the researcher has access to the original text, to contribute to meaningful interpretation of results generated.

Further analytic/integrative strategies

(Bazeley 2009b; 2010a; 2010b)

- Intensive case analysis
- Employment of the results from analysis of one form of data in approaching the analysis of another form of data (referred to by Caracelli & Greeene, 1993, as typology development)
- Extreme and negative case analysis
- Flexible, iterative analyses involving multiple, sequenced phases where the conduct of each phase arises out of or draws on the analysis of the preceding phase
- Inherently mixed data analysis, where a single source gives rise to both qualitative and quantitative information, such as in some forms of social network analysis (Teddlie & Tashakkori, 2009)
- Use of visual techniques in combination with statistical and/or text-based data, for example, using geographic information systems (GIS) (Knigge & Cope, 2006)
- Case-based data analysis techniques with small to medium-N samples using qualitative comparative analysis (Rihoux & Ragin, 2009).

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