Introduction to mixed methods research

By Simon Moss

# Introduction

Many researchers will collect a blend of qualitative data—that is, data that comprise words— and quantitative data—that is, data that comprise numbers. Many, but not all, researchers utilize the term mixed-methods research to refer to studies that report both qualitative data and quantitative data. This document will offer some insights into how to apply this mixed-methods approach.

**Do you need to learn about these approaches?**

If you plan to collect at least some qualitative data and at least some quantitative data, you should read this document. Admittedly, you might feel you do not need to read this document because

* you plan to learn about qualitative research and quantitative research separately
* you feel this understanding of qualitative research and quantitative research is sufficient to conduct mixed-methods research

This perspective is not entirely accurate, however. Even researchers who have developed vast expertise in qualitative research and quantitative research do not always conduct mixed-methods research appropriately. That is, when you plan to blend qualitative research and quantitative research, you need to be cognisant of other methods, approaches, complications, and principles. That is, you need to learn about practices that are specific to mixed-methods research.

# Techniques to blend qualitative data and quantitative data

Consider the following example. Suppose you want to explore whether PhD and Masters by Research candidates benefit from humble supervisors. To explore this matter, you collect both qualitative data and quantitative data. To collect qualitative data, you interview research candidates about their experiences. An excerpt of the data appears in the following box.

|  |
| --- |
| “I really like how my supervisor has disclosed her faults. She admits that she is not a good writer. I therefore feel more comfortable admitting my worries…” |

To collect quantitative data, you administer a survey to all research candidates. The survey assesses a variety of characteristics, such as the degree to which the supervisors are humble and the satisfaction of candidates on a 10-point scale. An excerpt of the data appears in the following table. Suppose the correlation between humility of supervisors and satisfaction of candidates is .7, indicating that humble supervisors tend to coincide with satisfied candidates.

|  |  |  |  |
| --- | --- | --- | --- |
| Humility of  supervisors | Satisfaction of  candidates | Progress of  candidates | Age of candidate |
| 5 | 6 | 3 | 5 |
| 1 | 1 | 3 | 9 |
| 4 | 4 | 8 | 3 |
| 7 | 3 | 6 | 1 |
| … | … | … | … |

So, how can you combine these sets of data? How do you derive conclusions from a blend of qualitative data with quantitative data? The following table defines, and then illustrates, several distinct approaches—similar to the approaches that Elizabeth Creamer (2017) distinguished (for other approaches, see Fetters, Curry, & Creswell, 2013).

|  |  |
| --- | --- |
| Approach | Illustration |
| **Combined variable\***. You could perhaps construct a variable from both the qualitative data and quantitative data | You might somehow develop a measure of candidate satisfaction that combines   * judgments from the interviews—such as your judgment of whether the candidate seems invigorated * responses to the survey   Or you might peruse the codes and responses to the survey to generate themes that blend the qualitative data and quantitative data. For example, one theme might entail   * codes that revolve around disclosing concerns * survey items in which supervisors are perceived to admit faults   The theme might integrate these features and revolve around the range of matters that supervisors are willing to disclose |
| **Derived items\*.** You generate survey items from the qualitative themes | You might uncover three facets of humility from the interviews: acknowledgement of personal faults, acknowledge of limitations in your discipline, and embracing other perspectives. You could then develop survey items to represent these three facets, such as   * My supervisor admits to his or her flaws * My supervisor recognizes his methodologies are imperfect * My supervisor is open to other approaches |
| **Converting**. You convert the qualitative data to quantitative data—or, occasionally, vice versa | You can apply many techniques, such as [content analysis](https://www.cdu.edu.au/files/2020-07/Introduction%20to%20Leximancer.docx), to convert qualitative data to quantitative data. For example, after each interview, you would   * determine whether supervisors disclosed their limitations * determine whether supervisors listened to alternative perspectives * determine whether candidates felt the course was better than expected * utilise this information to estimate a score of supervision humility and candidate satisfaction * subject these scores to quantitative analyses   You can also convert quantitative data to qualitative information. For instance, you could instead embed the quantitative data into a [case study](https://www.cdu.edu.au/files/2020-07/Introduction%20to%20case%20studies%20-%20the%20Yin%20approach.docx) or narrative about each participant |
| **Extreme case sampling**. You identify extreme cases, usually from the quantitative data, and then explore these extreme cases qualitatively, often using interviews | You might first instruct participants to complete a survey that assesses the humility of their supervisors and their own satisfaction with the course. You might then only interview the participants whose satisfaction is particularly high or low. |
| **Cross-case comparison**. You compare cases on both qualitative data and quantitative data | * You might compare different subsets of cases—such as maths candidates and business candidates * You might discover that supervisors tend to acknowledge their limitations in communication if they study maths but acknowledge their limitations in empathy if they study business * You might also discover more humility and progress in maths * Taken together, this comparison between maths and business candidate might indicate that how humility affects candidates depends on the limitations supervisors tend to acknowledge. |
| **Meta-inferences.** You generate insights form the qualitative data and quantitative data separately—and then compare, modify, as well as integrate these insights | * Your qualitative data might reveal that candidates feel more confident when supervisors are humble * Your quantitative data might reveal a positive association between supervisor humility and candidate satisfaction * When combined, these data indicate that humble supervisors might enhance confidence and satisfaction; indeed, the increased confidence could promote the satisfaction. |

\* NB. Creamer refers to both these approaches as blending

One of the most effective techniques to combine and to display the results of mixed methods is called the pillar integration process, developed by Johnson, Grove, and Clarke (2019). To complete this technique, researchers should

* first list the key quantitative insights in one column and the key qualitative themes in another column
* next attempt to match these quantitative and qualitative insights—and assign matched or overlapping insights to the same row
* then review the data to check this matching is indeed accurate
* finally integrate these matched columns. For more information, read Johnson, Grove, and Clarke (2019)

# Mixed-methods designs

Researchers can utilize a variety of strategies to integrate qualitative research and quantitative research. That is, researchers have developed a variety of mixed-methods designs. Despite the multitude of these designs, Creamer (2017) suggested that only three main characteristics differ across these designs:

* the sequence in which the data are collected—such as whether qualitative data are collected before quantitative data
* the sequence in which the data are analysed—such as whether the qualitative data and quantitative data are analysed together or in sequence
* the priority attached to qualitative data or quantitative data.

The following table outlines the various options that correspond to these three characteristics (for a similar typology, see Leech & Onwuegbuzie, 2009). In addition, this table presents some insights about some of these options

|  |  |
| --- | --- |
| Option | Examples or insights |
| **The sequence in which the data are collected** |  |
| Concurrent—that is, qualitative and quantitative data are collected simultaneously | * A survey may comprise items in which participants choose one of several numbers as well as questions that demand text responses. |
| Qualitative data are collected before quantitative data | * Often called sequential exploratory, because the qualitative data are collected to explore and identify issues that could then be examined quantitatively * For example, the qualitative data might be applied to develop a questionnaire (e.g., Creswell et al., 2004) |
| Quantitative data are collected before qualitative data | * Often called sequential explanatory, because the qualitative data are often collected to explain or to clarify the observations that emerged from the quantitative data (for a discussion of this design, see Ivankova et al., 2006) |
| Iterative or multiphase—in which qualitative data and quantitative data are collected more than once and often interspersed |  |
| **The sequence in which the data are analysed** |  |
| Concurrent | * The qualitative data and quantitative data are often analysed together * For example, each theme might emanate from an examination of both interview data and numerical survey responses |
| Sequential | * The qualitative data are analysed before or after the quantitative data are analysed |
| Multiphase | * The researcher analyses the data across several phases—applicable only when the data are collected iteratively over time |
| **Priority** |  |
| Quantitative | * Often the qualitative data are merely short responses to open-ended questions at the end of surveys or after experiments * Alternatively, the data may be primarily qualitative but then converted to numbers after a content analysis or similar technique is applied |
| Qualitative | * Often the quantitative data are merely a few descriptive statistics or numbers derived from only a small number of participants |
| Equal |  |

To some extent, which of these approaches you should choose depends on the study (for other insights on how to delineate and choose a design, see Teddlie & Tashakkori, 2006). Fetters, Curry, and Creswell (2013), for example, distinguished four kinds of studies in which mixed methods is common:

* intervention in which you study the effects of some intervention
* case studies in which you present a comprehensive narrative about an interesting case, person, event, or circumstance
* participatory in which you collaborate with a community to solve a problem
* multistage research in which you explore a phenomenon iteratively over time

Researchers often apply specific designs to conduct each of these four kinds of studies. For example

* if the research is intervention, researchers often prioritize quantitative data
* if the research entails a case study, researchers often prioritize qualitative data
* if the research is participatory, the community often shapes the design
* if the research is multistage, researchers often shift between qualitative data collection and quantitative data collection

# How to evaluate mixed methods research

Because of several reasons, researchers often need to evaluate research. To illustrate

* they might need to evaluate their own research, partly to decide how to improve their design
* they might need to evaluate the research of other studies when conducting a synthesis or review—perhaps to decide which studies to include.

Researchers apply a variety of taxonomies or principles to evaluate research. For example,

* to evaluate quantitative research, scholars tend to consider whether participants were randomly assigned to conditions, whether the measures are valid, and so forth
* to evaluate quantitative research, scholars tend to consider whether the insights are useful, whether the themes match the data, and so forth

To evaluate mixed methods research, scholars need to apply taxonomies or principles that are specific to mixed-methods research (e.g., Leech et al., 2010). Although many possibilities have been proposed, Creamer (2017) developed a scheme called the mixed methods evaluation rubric. The following table presents an excerpt of this rubric.

|  |  |  |
| --- | --- | --- |
| Criterion | Least suitable practice | Most suitable practice |
| Transparency | * Does not refer to the benefits of mixed-methods at all | * Explicitly specifies the benefits of mixed-methods in this study. * In particular, the researcher clarifies the practices they applied to design the research, analyse the data, interpret the analysis, and report the study—and then justifies these practices * For example, to justify the design, they might specify why they collected the qualitative or quantitative data in a particular order and why they prioritized the qualitative data, quantitative data, or both |
| Degree of mixing | * Qualitative and quantitative is not mixed during any phase | * Qualitative and quantitative is mixed during the design, data collection or sampling, analysis, and interpretation |
| Interpretative comprehensiveness | * Inconsistencies between the qualitative and quantitative data or insights are not identified or not explained | * Inconsistencies between the qualitative and quantitative data or insights are explored, identified, and explained |
| Methodological foundation | * The researcher does not refer to the underlying methodology. | * The researcher refers to three methodologies around mixed-methods |

Creamer (2017) actually developed a more precise scheme to quantify these evaluations. Each criterion is assigned a score, usually from 0 to 4. For example, to evaluate the degree of mixing, the researcher would estimate the number of phases in which qualitative perspectives and quantitative perspectives were combined. When this rubric or similar criteria are applied, scholars have shown that mixed-methods studies are often flawed (e.g., O'Cathain et al., 2008). Nevertheless, you should note several caveats

* even when researchers conduct mixed-methods research, they should still apply many of the practices that optimize qualitative research and quantitative research
* the appropriate criteria should partly depend on the paradigm that researchers adopt—such as whether they adopt a paradigm of pragmaticism, dialectical pluralism, transformative-emancipatory, or critical realism, as recommended by Hall (2013); for a discussion of these paradigms, read [this document](https://www.cdu.edu.au/files/2020-07/Introduction%20to%20pragmatism.docx)

**Justifications of mixed methods**

To conduct research that scholars respect, you need to justify your decision to conduct mixed methods. The following table itemizes some of the reasons that researchers utilize to justify mixed methods.

|  |  |
| --- | --- |
| Reason | Details |
| Triangulation and confirmation | * Researchers often collect both qualitative data and quantitative data to validate one another, called triangulation * They might, for example, collect numerical responses and text responses from a survey about the same topic—such as whether humility in supervisors enhances satisfaction in candidates * If both qualitative data and quantitative data generate comparable findings, they can be more confident in these results * That is, they can be more certain the results cannot be ascribed to some anomaly in the data |
| Evaluation studies | * If researchers want to examine whether some intervention or program was effective, the quantitative data will assess whether the intervention was effective, and the qualitative data will characterize the perceptions of participants * These qualitative data are vital if the researchers want to improve the degree to which the intervention seems appealing to participants * The qualitative data may also evaluate the extent to which the intervention was implemented effectively, called fidelity |
| Development of quantitative measures | * Qualitative data may be collected to justify and inform the construction of quantitative measures |
| Development of theory | * Researchers might conduct a series of studies in which they develop and then test various theories or arguments * The quantitative data might uncover some pattern in the data * The qualitative data, often derived from interviews, might explain this pattern * The quantitative data could then test this explanation, and so forth |
| Case studies | * Qualitative data and quantitative data might be combined to generate more detailed and comprehensive accounts of a case—such as an interesting person |

# References

Creamer, E. G. (2017). An introduction to fully integrated mixed methods research. Sage.

Creswell, J. W., Fetters, M. D., & Ivankova, N. V. (2004). Designing a mixed methods study in primary care. The Annals of Family Medicine, 2(1), 7-12.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—principles and practices. Health services research, 48, 2134-2156.

Hall, R. (2013). Mixed methods: In search of a paradigm. Conducting research in a changing and challenging world, 71-78.

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. Field methods, 18(1), 3-20.

Johnson, R. E., Grove, A. L., & Clarke, A. (2019). Pillar integration process: A joint display technique to integrate data in mixed methods research. Journal of Mixed Methods Research, 13, 301-320.

Leech, N. L., Dellinger, A. B., Brannagan, K. B., & Tanaka, H. (2010). Evaluating mixed research studies: A mixed methods approach. Journal of Mixed Methods Research, 4(1), 17-31.

Leech, N. L., & Onwuegbuzie, A. J. (2009). A typology of mixed methods research designs. Quality & quantity, 43(2), 265-275.

O'Cathain, A., Murphy, E., & Nicholl, J. (2008). The quality of mixed methods studies in health services research. Journal of Health Services Research & Policy, 13(2), 92-98.

Teddlie, C., & Tashakkori, A. (2006). A general typology of research designs featuring mixed methods. Research in the Schools, 13(1), 12-28.