

Understanding Mixed Methods Research: Busting Common Myths and Misconceptions

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Abstract

Dispelling mixed methods research myths and misunderstandings is this article's major contribution. Starting with mixed methods research, it challenges the idea that one method must predominate in mixed methods studies and that quantitative research is inherently more reliable than qualitative. The article also discusses targeting, sampling, and data accuracy. It also emphasizes the importance of choosing an appropriate population and sample for the study to ensure generalizability and provides strategies for avoiding misconceptions. This article challenges mixed methods research myths and stresses the importance of careful planning and execution. This article can help researchers conduct high-quality mixed methods research by advising them on how to integrate quantitative and qualitative data, to choose a population and sample, and to ensure research results' validity and reliability.

Keywords: *Mixed methods research, Misconceptions, Best practices, Qualitative research, Quantitative research.*

Introduction

According to Johnson and Onwuegbuzie (2004), Teddlie and Tashakkori (2009), and Creswell and Plano Clark (2018), mixed methods research has gained popularity in recent years across various disciplines such as education, social sciences, and health sciences. The use of mixed methods research has increased steadily over the past two decades, with more than 50% of articles published in some leading journals in the social and behavioral sciences reporting the use of mixed methods research (Creswell & Plano Clark, 2018). This trend is evident in other disciplines such as education and health sciences as well (O'Cathain et al., 2008; Teddlie & Tashakkori, 2009). In a more recent study by Tashakkori et al. (2020), they found that mixed methods research is becoming increasingly popular across various fields, including education, social sciences, and health care. They attribute the growing popularity of mixed methods to its ability to provide a more comprehensive and nuanced understanding of research questions and to address the limitations of using only one method.

The popularity of mixed methods research can be attributed to several factors, including its ability to provide a more comprehensive understanding of research questions, its flexibility in combining both qualitative and quantitative data, and its potential to enhance the validity and reliability of research findings (Johnson & Onwuegbuzie, 2004; Teddlie & Tashakkori, 2009). Mixed methods research also offers the potential to triangulate findings, allowing researchers to examine convergence and divergence across different sources of data, and to explore the complexity of the phenomena under investigation (Creswell & Plano Clark, 2018). However, despite its popularity, several misconceptions surrounding mixed methods research can affect its efficacy and rigor. This article aims to discuss some of the most prevalent misconceptions regarding mixed methods research and provide strategies for avoiding them.

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One common misconception is that mixed methods research is simply the combination of qualitative and quantitative data. However, mixed methods research requires a deliberate integration of qualitative and quantitative data to provide a comprehensive understanding of the research question (Creswell et al., 2003; Johnson et al., 2007; Onwuegbuzie & Collins, 2007). Another misconception is the belief that quantitative research is superior to qualitative research. This misconception can lead to a bias towards the quantitative component of mixed methods research and neglect the important insights that qualitative data can provide. In mixed methods research, both methods should be given equal importance and integrated effectively to answer research questions (Teddlie & Tashakkori, 2009). A related misconception is that mixed methods research requires the equal use of qualitative and quantitative data. However, the choice of methods should be determined by the research question and the nature of the data being collected. Sometimes, one method might be more suitable than the other, and in other cases, both methods might be used in a complementary way to provide a more comprehensive understanding (Creswell et al., 2003, p. 216). Another misconception is that the selection of the target group and study sample is straightforward and unrelated. However, selecting a sample that is representative of the target group and is appropriate for both qualitative and quantitative methods can be challenging. It requires careful consideration of the research question, data collection methods, and sampling techniques (Teddlie & Tashakkori, 2009). Finally, there is a misconception that the process of ensuring the reliability of qualitative and quantitative research data collection instruments is identical. However, reliability is assessed differently in qualitative and quantitative methods. In mixed methods research, it is essential to ensure that both methods are reliable and valid in their respective contexts (Bryman, 2006; Creswell et al., 2003).

Implementing best practices in mixed methods research can enhance the quality and rigor of research, resulting in more nuanced and significant data. This can be accomplished via meticulous planning, method selection, and adherence to established standards. To ensure the successful implementation of mixed methods research, it is crucial to define precise research objectives and to choose methods that complement one another. This might involve employing qualitative methods to investigate in-depth the experiences or perceptions of participants, and quantitative methods to determine the prevalence of these experiences or perceptions in a larger population. Researchers can obtain a more comprehensive understanding of the research query by combining the strengths of both approaches.

The most common myths and misconceptions about mixed methods research

Mixed methods research has become increasingly popular in recent years because it allows researchers to draw on both qualitative and quantitative approaches to address research questions. However, despite its growing popularity, there are still common misconceptions about what mixed methods research entails and how it should be conducted. These misconceptions can lead to errors in research design, implementation, and analysis, ultimately compromising the quality and validity of research findings. It is, therefore, crucial for researchers to have a correct understanding of mixed methods research and its best practices. In this section, we will explore some of the most common misconceptions about mixed methods research, highlight their potential impact on research outcomes, and provide suggestions for avoiding these errors.

Mixed methods research is simply the combination of qualitative and quantitative data

Among the most common myths and misconceptions about mixed methods research is the idea that it involves simply combining qualitative and quantitative data. Actually, mixed methods research is not simply the combination of qualitative and quantitative data, but rather it involves the integration of the two methods in a systematic and rigorous manner to enhance the understanding of complex phenomena (Creswell et al., 2003, p. 212). Qualitative and quantitative data can be collected separately or

concurrently, but the key feature of mixed methods research is the integration of the two types of data to produce a more comprehensive understanding of the research question (Creswell et al., 2003, p. 203).

One of the benefits of using mixed methods research is that it can provide a more complete understanding of complex phenomena by integrating the strengths of both qualitative and quantitative methods (Teddlie & Tashakkori, 2009). Qualitative methods can provide rich and detailed information about the experiences and perspectives of participants, whereas quantitative methods can provide statistical evidence of the prevalence and distribution of variables in a population (Creswell et al., 2003, p. 203). By integrating these two methods, mixed methods research can provide a more comprehensive understanding of the research question than either method alone (Datta & Furr, 2014, p.5). Moreover, mixed methods research is not just about combining qualitative and quantitative data, but also about ensuring that the data are integrated in a meaningful way to provide a more complete understanding of the research question. The integration of the data can take different forms, such as using qualitative data to help interpret quantitative findings or using quantitative data to identify patterns or trends that can be explored further using qualitative methods (Morse, 2015a, 2015b; Plano Clark & Ivankova, 2016; Tashakkori et al., 2020). The integration of the data is guided by the research question and the objectives of the study, and should be undertaken in a systematic and rigorous manner to ensure the validity and reliability of the findings. Another important aspect of mixed methods research is the use of multiple sources of data to enhance the validity and reliability of the findings. For example, mixed methods research can involve the use of multiple methods of data collection, such as surveys, interviews, and focus groups, to provide a more comprehensive understanding of the research question (Creswell et al., 2003). By using multiple sources of data, mixed methods research can increase the validity and reliability of the findings by triangulating the data and ensuring that the findings are consistent across different methods of data collection.

There are additional references and details that clarify the misconception that mixed methods research is merely the combination of qualitative and quantitative data: It is essential to note that mixed methods research entails more than simply combining qualitative and quantitative methodologies in a single study. According to Onwuegbuzie and Johnson (2006), mixed methods research necessitates a "philosophical, paradigmatic, and theoretical framework that governs the integration of quantitative and qualitative data in a study" (p. 123). This indicates that mixed methods research is not simply a matter of combining two distinct methods, but rather requires a more in-depth examination of the epistemological assumptions, theoretical frameworks, and research designs that direct the integration of these methods. Furthermore, research has demonstrated that mixed methods research necessitates a more sophisticated comprehension of research methodologies and data analysis techniques than do qualitative or quantitative methods alone (Greene et al., 1989). This is due to the fact that mixed methods research entails a more complex process of data collection, analysis, and interpretation than either method alone, necessitating a higher level of expertise and knowledge with both qualitative and quantitative methods. Another study by O'Cathain et al. (2008) demonstrates that mixed methods research is more than the combination of qualitative and quantitative data. They argue that mixed methods research involves combining the strengths of qualitative and quantitative methods, enabling researchers to address complex research questions and to obtain a more comprehensive understanding of the investigated phenomenon. The integration of qualitative and quantitative data requires a number of essential stages, including identifying the research question, selecting appropriate methods for data collection, analyzing and integrating the data, and interpreting the results (O'Cathain et al., 2008). Additionally, Creswell et al.'s (2003) study highlights the significance of integrating qualitative and quantitative data in mixed methods research. They suggest that the integration of qualitative and quantitative data should not be limited merely to merging the data from the two methods, but should involve a more systematic and purposeful integration of the data. This integration can be accomplished in a number of ways, such as by using one method to supplement the findings of the other, by using one

method to develop a theoretical framework for the other, or by using both methods to investigate various aspects of the research question (Creswell et al., 2003).

A study by Creswell and Plano Clark (2018) also highlights the fact that mixed methods research involves more than simply integrating qualitative and quantitative data. They contend that mixed methods research is a distinct research approach involving the systematic collection and analysis of both qualitative and quantitative data in a single study, with the aim of generating a more comprehensive and nuanced understanding of the research question. Mixed methods research is distinguished from other research approaches by its emphasis on integrating qualitative and quantitative data, its use of multiple data collection and analysis methods, and its emphasis on the importance of context and multiple perspectives in understanding complex phenomena (Creswell & Plano Clark, 2018).

Based on the aforementioned arguments, it can be concluded that mixed methods research is not merely the combination of qualitative and quantitative data, but also the integration of the strengths of both approaches to provide a more comprehensive understanding of complex phenomena. The integration of qualitative and quantitative data necessitates a strategic and methodical approach, involving a variety of stages from identifying the research question to interpreting the results. Mixed methods research is distinguished from other research methodologies by the systematic accumulation and analysis of both qualitative and quantitative data within a single study.

Quantitative research is superior to qualitative research

The debate on whether quantitative research is superior to qualitative research or vice versa has been ongoing in the field of research for decades. Some scholars argue that quantitative research is superior because it involves a large sample size, produces data that are easy to analyze and generalize, and is based on objective measures (cf. Mertens, 2015). Others argue that qualitative research is superior because it provides rich and detailed data that cannot be obtained through quantitative methods, allows for a deeper understanding of social phenomena, and is more flexible in its approach (cf. Creswell & Poth, 2016). However, it is important to note that both quantitative and qualitative research methods have their own strengths and weaknesses, and which method is *superior* depends on the research question, the research design, and the goals of the study. For example, if the research question is focused on testing a hypothesis or making predictions, then quantitative research might be more appropriate. On the other hand, if the research question is focused on exploring a complex social phenomenon or understanding the perspectives of individuals, then qualitative research might be more appropriate (Creswell, 2014).

Quantitative research typically involves the collection and analysis of numerical data, and involves the use of statistical analysis to draw conclusions. This method often is used to answer questions about relationships between variables and to identify patterns and trends in data. Quantitative research is typically more structured, with a set of predetermined research questions and a standardized data collection process (Babbie, 2016; Bryman, 2015; Creswell, 2014; Mertens, 2015; Neuman, 2013). On the other hand, qualitative research is typically more exploratory in nature and involves collecting non-numerical data, such as interviews, observations, and open-ended survey responses. Qualitative research often is used to gain insights into complex phenomena, such as human behavior and experiences, and to explore underlying motivations and beliefs. This method is typically less structured, allowing for more flexibility in data collection and analysis (Creswell & Poth, 2016; Denzin & Lincoln, 2011; Merriam & Tisdell, 2015; Morse, 2015a, 2015b; Patton, 2015).

It is important to note that neither method is inherently *better* than the other, and the choice of method depends on the research question, the research design, and the goals of the study. For example, if the research question is focused on understanding the experiences and perspectives of individuals,

qualitative research might be more appropriate. On the other hand, if the research question is focused on identifying relationships among variables, quantitative research might be more appropriate.

One criticism of quantitative research is that it can be too narrowly focused and might miss important contextual information that is necessary to understand fully the phenomenon being studied (Babbie, 2016; Creswell, 2014; Denzin & Lincoln, 2011; Maxwell, 2013; Neuman, 2013; Tashakkori et al., 2020). Qualitative research, on the other hand, may be criticized for lacking generalizability and reliability, because the data collected often are subjective and might not be representative of the population as a whole. However, it is important to note that both methods can be used in combination via mixed methods research, which involves the integration of both quantitative and qualitative methods within a single study. This approach can provide a more comprehensive understanding of the phenomenon being studied and can help to address the limitations of each method when used alone.

In conclusion, whether quantitative research is superior to qualitative research, or vice versa, is not a straightforward answer. Both methods have their own strengths and weaknesses, and the choice of method depends on the research question, the research design, and the goals of the study. Furthermore, mixed methods research can provide a more comprehensive understanding of the phenomenon being studied by integrating both quantitative and qualitative methods.

Mixed methods research necessitates the use of qualitative and quantitative data equally

Mixed methods research does not require the equal use of qualitative and quantitative data. It is a research approach that integrates both qualitative and quantitative data within a single study to answer research questions. The integration of both methods can be conducted in different ways, depending on the research question and the goals of the study.

One way to integrate qualitative and quantitative data is to use one method to complement the other. For example, quantitative data can be used to provide a general understanding of a phenomenon, whereas qualitative data can be used to explore the nuances and complexities of the same phenomenon. Another way to integrate both methods is to use them in parallel to provide a more comprehensive understanding of the research question. Another important consideration is the integration of qualitative and quantitative data during the analysis phase. This can be undertaken in different ways, including merging data, comparing data, or using one data set to explain or to illustrate the other (Fetters et al., 2013).

In terms of the relative emphasis given to qualitative and quantitative data in mixed methods research, some researchers suggest that the emphasis should be determined by the research question and the goals of the study, rather than a predetermined ratio of qualitative to quantitative data (Bazeley, 2018). According to Creswell and Plano Clark (2018), mixed methods research can be characterized by the relative emphasis given to qualitative and quantitative data. They identify three types of mixed methods research: (a) quantitative dominant, (b) qualitative dominant, and (c) equal emphasis. In quantitative dominant mixed methods research, the focus is on collecting and analyzing quantitative data, with qualitative data serving a complementary role. In qualitative dominant mixed methods research, the focus is on collecting and analyzing qualitative data, with quantitative data serving a complementary role. In equal emphasis mixed methods research, both qualitative and quantitative data are given equal emphasis and are used to address research questions.

Another reason why mixed methods research does not require equal use of qualitative and quantitative data is that the methods can be used in different ways to achieve different goals. For example, a mixed methods study may use qualitative data to generate hypotheses or to explore a phenomenon in depth,

while using quantitative data to test those hypotheses or to measure the prevalence of the phenomenon (Johnson & Onwuegbuzie, 2004).

Furthermore, the relative emphasis given to qualitative and quantitative data may change throughout the course of a mixed methods study. For example, the initial phase of a study may involve collecting qualitative data to develop an understanding of the phenomenon, followed by a quantitative phase to measure the prevalence or impact of the phenomenon (Creswell & Plano Clark, 2018).

Mixed methods research does not require equal use of qualitative and quantitative data. The weight given to each type of data can vary based on the research question and objectives of the study, and different methods can be used to achieve different objectives. In addition, the relative importance of qualitative and quantitative data may shift over the course of a mixed methods investigation.

The selection of the target population and research sample is simple and unrelated

The selection of the target group and study sample in mixed methods research is not always straightforward and might be related or unrelated depending on the research question, purpose of the study, and data collection methods. The selection of the target group involves identifying the population of interest that the researcher intends to which to generalize their findings, whereas the study sample is a subset of that population that is selected for the actual study. The selection of the study sample is critical to ensure the validity and generalizability of the research findings.

Various sampling techniques, such as random sampling, stratified sampling, and cluster sampling, can be used to ensure that the sample is representative of the population. The decision to use the same or different sample of informants for qualitative and quantitative research in mixed methods research depends on the specific research context and should be carefully considered based on the potential advantages and disadvantages. Ultimately, the selection of the target group and study sample should be based on the research question, purpose of the study, and characteristics of the population being studied.

According to Creswell (2014), selecting the appropriate target population is crucial in determining the external validity of the findings of a study. The researcher needs to ensure that the target population is representative of the group to which the findings will be generalized, otherwise, the results might not be applicable in real-world situations. Thus, the selection of the target population must be based on a clear understanding of the research question, the purpose of the study, and the characteristics of the population being studied (p. 107). Once the target population has been identified, the researcher needs to select a sample that accurately represents that population. This is important in ensuring that the findings are unbiased and valid. Random sampling, stratified sampling, and cluster sampling are some of the sampling techniques that can be used to ensure that the sample is representative of the population (Creswell, 2014, p. 107). In addition, the size of the sample is also an important consideration. As noted by Bryman and Bell (2015), a large sample size can increase the reliability of the results, whereas a small sample size may limit the generalizability of the findings (p. 129).

The selection of the target group and study sample is an important aspect of mixed methods research that should be carefully considered based on the research question, purpose of the study, and data collection methods. The target group refers to the population of interest that the researcher aims to generalize their findings to, whereas the study sample is a subset of that population that is selected for the actual study (Bryman, 2015; Creswell & Plano Clark, 2018, p. 54). In some cases, using the same group of informants can be advantageous, particularly when there is limited time or resources to recruit new participants, or when the research involves sensitive topics or hard-to-reach populations. This approach also can facilitate triangulation and provide a more comprehensive understanding of the research topic, leading to increased validity and reliability of the results. However, there are situations

where using the same group of informants might not be recommended, such as when there is a risk of contamination or potential for fatigue or boredom. Therefore, researchers should carefully consider the potential advantages and disadvantages of using the same group of informants and make an informed decision based on their specific research context (Creswell & Plano Clark, 2018; Guetterman et al., 2015; Johnson & Onwuegbuzie, 2004).

There are situations wherein using the same sample or informants is advantageous and others where it is not recommended. Using the same sample or informants also can be useful when there is limited time or resources to recruit new participants. In cases where the research involves sensitive topics or hard-to-reach populations, using the same sample or informants can be more practical and ethical. This approach also can be more cost-effective and reduce the burden on participants (Guetterman et al., 2015, p. 404). However, using the same sample or informants in mixed methods research can provide a more comprehensive understanding of the research topic because it allows for a deeper exploration of the issues being studied. This approach can facilitate triangulation, wherein findings from one method can be compared and contrasted with those from the other method, leading to increased validity and reliability of the results (Creswell & Plano Clark, 2018, p. 54). However, there are situations whereby using the same sample or informants might not be recommended. For example, if there is a risk of contamination, where participants might inadvertently or intentionally alter their responses in the second phase based on their experience in the first phase, then it might be necessary to use a different sample or informants. Similarly, if there is a potential for fatigue or boredom, wherein participants might become disengaged with the study or provide less accurate responses in the second phase, then using a different sample or informants might be preferable (Johnson & Onwuegbuzie, 2004, pp. 20-21). Ultimately, the decision to use the same sample or informants in mixed methods research should be based on the research question, the purpose of the study, and the characteristics of the population being studied. Researchers should carefully consider the potential advantages and disadvantages of using the same sample or informants and make an informed decision based on their specific research context (Creswell & Plano Clark, 2018, p. 149).

In conclusion, the selection of the target group and study sample are closely related and should be considered together in the research design process. The selection of the target population should be based on a clear understanding of the research question, the purpose of the study, and the characteristics of the population being studied. The sample selection process is crucial in ensuring that the study yields findings that are unbiased and valid, and sampling techniques can be used to ensure that the sample is representative of the population.

Is it true that the process of ensuring the reliability of qualitative and quantitative research data collection instruments is identical?

The process of ensuring the reliability of qualitative and quantitative research data collection instruments is not identical. In quantitative research, reliability refers to the extent to which a measure consistently produces the same results when repeated under the same conditions. To ensure the score reliability of quantitative research instruments, techniques such as test-retest reliability, inter-rater reliability, and internal consistency are used (Mertens, 2015, p. 176; Nevo & Slonim-Nevo, 2011, p. 28). In contrast, in qualitative research, the concept of reliability is different and is often referred to as *trustworthiness* or *dependability*. The goal of ensuring the trustworthiness of qualitative research is to establish the credibility, transferability, dependability, and confirmability of the findings. Techniques such as member checking, peer review, and triangulation can be used to ensure the trustworthiness of qualitative data (Lincoln & Guba, 1985, p. 301; Morrow, 2005, p. 97).

One way to establish credibility in qualitative research is through member checking, where the researcher returns to participants to verify the accuracy of the findings (Creswell, 2014). Another

technique is to use multiple sources of data or triangulation, where different sources of data are used to confirm the findings (Patton, 2015). Peer review is also an important technique, wherein other researchers review and critique the research to ensure its credibility (Morrow, 2005).

Transferability refers to the extent to which the findings can be transferred to other contexts or situations. In qualitative research, transferability is established by providing a rich description of the context and the participants, which allows readers to determine the extent to which the findings can be applied in other contexts (Lincoln & Guba, 1985). Dependability refers to the stability and consistency of the findings over time, and can be established through techniques such as prolonged engagement and audit trails, which allow for a record of the research process (Creswell, 2014). Finally, confirmability refers to the objectivity of the research findings, and can be established through techniques such as reflexivity, where the researcher reflects on their own biases and assumptions (Patton, 2015).

In quantitative research, one technique for ensuring reliability is test-retest reliability, whereby the same measure is administered to the same participants at different times to ensure consistency of results (Mertens, 2015). Inter-rater reliability is another technique, which involves multiple raters independently scoring the same measure to ensure consistency (Nevo & Slonim-Nevo, 2011). Internal consistency, which measures the extent to which different items on a questionnaire measure the same construct, is also important in ensuring reliability (DeVellis, 2017). For example, in a study examining the score reliability of a depression scale, the researchers might administer the scale to the same group of participants on two different occasions and compare the results. If the scores are consistent across the two administrations, the scale can be considered as yielding reliable scores. In another study, multiple raters might be asked to rate the same set of behaviors, and their ratings compared to ensure consistency. Similarly, in a study measuring job satisfaction, internal consistency might be assessed by examining how different questions on the questionnaire measuring job satisfaction are correlated with one another.

In mixed methods research, both quantitative and qualitative techniques are used, and therefore, both reliability and trustworthiness are important considerations. Researchers must ensure that their research instruments yield reliable scores and that their ensuing findings are trustworthy. Techniques such as concurrent and sequential data collection, cross-validation, and follow-up studies can be used to establish the validity and reliability of findings stemming from a mixed methods research study (Creswell & Plano Clark, 2018, p. 323; Fetters et al., 2013, p. 193).

Does the in-depth interview guideline require an Index of Qualitative Variation numerical validation check?

Many research authors hold a misconception regarding the quality of data collection tools, such as the in-depth interview approach in qualitative research, particularly among novice researchers or those unfamiliar with qualitative research and university students. These issues might be indicative of the researcher's limited experience with qualitative and mixed research methodologies, as well as a lack of proficiency in their implementation, which can impact the quality of the study (Smith & Osborn, 2015). Moreover, the lack of exposure to diverse research methods might restrict researcher's ability to conduct high-quality research and might lead to a narrow or incomplete understanding of the research question (Bazeley, 2018). It is crucial for researchers to receive proper training and guidance in qualitative research methods to ensure the quality and rigor of their research.

In-depth interview guidelines do not require an Index of Qualitative Variation (IOC) numerical validation check, because the IOC is a statistical measure used to assess the variability of responses in a closed-ended survey or questionnaire (Carlsen & Glenton, 2011; Guetterman et al., 2015; Streiner & Kottner, 2014). In other words, the IOC is a method of calculating the degree of variation in responses

when the response options are limited and predetermined. However, in-depth interviews are an open-ended form of data collection that allow participants to provide detailed and nuanced responses to questions, without being limited to specific response options. As a result, the variation in responses among participants is expected to be high, making the use of the IOC unnecessary and potentially misleading (Hsieh & Shannon, 2005). Furthermore, the IOC is not a measure of the validity or reliability of data, but rather a measure of the variability in responses. Therefore, the use of the IOC might not be relevant or applicable to the evaluation of the quality of data collected through in-depth interviews because these interviews prioritize the collection of rich and detailed responses over the collection of standardized data (Guest et al., 2006). Instead, the evaluation of the quality of in-depth interview data requires the use of other techniques, such as thematic analysis or member checking, which focus on the rigor and accuracy of the data collection process and the interpretation of the data (Braun & Clarke, 2019).

However, in-depth interview guidelines can be validated via other means, such as expert review, pilot testing, and member checking (Guest et al., 2006; Kvale & Brinkmann, 2009). These validation methods are used to ensure that the interview questions are clear, relevant, and appropriate for the research question, and that they elicit rich and informative data from participants. It is important to note that the validation process should be guided by the principles of trustworthiness and rigor in qualitative research, which emphasize transparency, reflexivity, and attention to context and multiple perspectives (Lincoln & Guba, 1985). Therefore, although numerical validation checks are not applicable for in-depth interview guidelines, other validation methods should be used to ensure the quality and credibility of the research findings.

To conduct a successful mixed methods research study, it is crucial that the researcher has a deep understanding of the research methodology, including both qualitative and quantitative approaches. Overall, ensuring the reliability of research findings is crucial in both qualitative and quantitative research, and requires different techniques depending on the type of research being conducted. In qualitative research, establishing the trustworthiness of the findings involves techniques such as member checking, triangulation, and peer review. In quantitative research, techniques such as test-retest reliability, inter-rater reliability, and internal consistency are used to ensure reliability.

The strengths and weaknesses of mixed methods research

Mixed methods research is a strategy for answering research questions that makes use of both quantitative and qualitative techniques. There are strengths and weaknesses to this approach, and they might change depending on the nature of the investigation being conducted. Some key benefits and drawbacks of mixed methods research studies are outlined in Table 1.

Table 1.
Strengths and weaknesses of mixed methods research

Strengths (Advantages)
- The ability to conduct tests and to validate pre-existing theories regarding the occurrence of phenomena, with a lesser emphasis on understanding the underlying reasons.
- Conducting hypothesis testing based on a priori constructed hypotheses prior to the collection of data.
- The data were collected. It is possible to generalize about research findings when the data are available.
- The results are derived from random samples that are of adequate size.
- The generalization of a research finding is possible when it has been replicated across numerous populations and subpopulations.

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- This tool is valuable for acquiring data that enable the formulation of quantitative predictions.
 - The researcher has the ability to design a scenario that effectively mitigates the impact of various extraneous factors, thereby enabling a more reliable evaluation of causal relationships.
 - The process of data collection can be expedited through the utilization of certain quantitative methods, such as telephone interviews.
 - Offers accurate and quantifiable numerical information.
 - Data analysis can be completed in a more efficient manner by utilizing statistical software, resulting in a reduction in the amount of time required for this process.
 - The research findings exhibit a degree of independence from the researcher, as evidenced by factors such as effect size and statistical significance.
 - It might have greater credibility with many influential individuals (administrators, politicians, program funders, etc.).
 - It is exceptionally beneficial for studying large populations and testing hypotheses.
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Weaknesses (Limitations)

- The categories employed by the researcher might not accurately capture the perspectives and interpretations of the local constituents.
 - The theories employed by the researcher might not accurately align with the perspectives held by local constituencies.
 - Researchers' attention might be directed away from phenomena that are taking place due to an emphasis on theory or hypothesis testing, rather than theory or hypothesis generation. This phenomenon is commonly referred to as confirmation bias.
 - The knowledge generated might possess a level of abstraction and generality that hinders its direct applicability to specific local circumstances, contexts, and individuals.
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The strengths and weaknesses of quantitative research are presented in a clear and organized manner in the Table 1, which indicates that mixed methods research affords several strengths. It allows for the testing and validation of pre-existing theories about phenomena, emphasizing the testing of hypotheses based on prior constructs. Mixed methods research facilitates generalization when data are collected from sufficiently large random samples and replicated across diverse populations. This method is advantageous for developing quantitative predictions, minimizing confounding variables, and expediting data collection. It offers precise, quantifiable numerical data and efficient data analysis through the use of statistical software. The results are relatively independent of the researcher, which might increase their credibility among influential figures. Mixed methods research is particularly useful for studying large populations and obtaining statistically significant results. Mixed methods research does have limitations, however. Relevance could be diminished if the employed categories and theories do not align with local perspectives. Focusing on theory and testing hypotheses might result in confirmation bias, causing one to overlook phenomena that have not yet been investigated. Knowledge generated might be excessively abstract and less directly applicable to particular local contexts, individuals, and contexts. When deciding on mixed methods research as a research strategy, researchers must consider these strengths and weaknesses (Johnson & Onwuegbuzie, 2004).

Strategies for avoiding the misconceptions

To avoid misconceptions in mixed methods research, careful planning, method selection, and adherence to established standards of rigor are necessary. In addition to being explicit about the purpose, research questions, and rationale, Creswell and Plano Clark (2018) also recommend that mixed methods researchers should pay careful attention to the design of their study, the sampling strategy, data collection procedures, data analysis methods, and the interpretation of their findings to ensure the rigor and quality of their research (pp. 12-13). Other scholars also have emphasized the importance of transparency and reflexivity in mixed methods research, including the clear documentation of research procedures, the consideration of alternative interpretations of the data, and the acknowledgement of the

researcher's own positionality and biases (Tashakkori et al., 2020). By following these guidelines, mixed methods researchers can enhance the credibility, transferability, dependability, and confirmability of their research findings, and contribute to the advancement of knowledge in their field.

In addition to ensuring the score reliability of data collection instruments, researchers also must consider the appropriateness of their sampling strategy and data collection methods for both the qualitative and quantitative aspects of their study because this can significantly impact the validity and generalizability of their findings (Creswell & Plano Clark, 2018, p. 199; Tashakkori et al., 2020, p. 125). For instance, although a probability sampling method might be suitable for the quantitative phase of the study, a purposive or convenience sampling method might be more appropriate for the qualitative phase (Creswell & Plano Clark, 2018). Also, data collection methods such as surveys, interviews, and observations might need to be adapted or modified to ensure that they capture both the quantitative and qualitative data needed to address the research question (Plano Clark & Ivankova, 2016, p. 72). Furthermore, to ensure that the mixed methods research is rigorous and produces trustworthy findings, researchers should carefully consider their sampling strategy and data collection methods to ensure that they are appropriate for both the qualitative and quantitative aspects of the study. Additionally, the use of established standards of rigor can help researchers avoid misconceptions and ensure the validity and reliability of their data. The *Journal of Mixed Methods Research* has published guidelines for mixed methods research that outline standards for design, data collection, analysis, and reporting. These guidelines can serve as a helpful reference for researchers who want to ensure that their mixed methods studies meet established standards of rigor (Creswell & Plano Clark, 2011, p. 17). Moreover, other researchers also have provided guidelines for ensuring rigor in mixed methods research, such as the guidelines proposed by Tashakkori et al. (2020) and Creswell and Plano Clark (2018), which include recommendations for triangulation, data analysis, and interpretation. By following established standards and guidelines, researchers can increase the trustworthiness and credibility of their mixed methods research.

Successful mixed methods research studies also can provide valuable guidance for avoiding misconceptions and implementing best practices in research because they demonstrate how the strengths of different methods can be leveraged to generate more comprehensive and insightful results (Bazeley, 2018, p. 6). Moreover, mixed methods research can help to address methodological limitations and biases that might be present in either qualitative or quantitative methods alone, providing a more comprehensive and reliable basis for understanding complex phenomena (Johnson et al., 2007).

In summary, dispelling misconceptions and implementing best practices is essential for producing high-quality and rigorous mixed methods research. By carefully planning and selecting appropriate methods, adhering to established standards of rigor, and learning from successful mixed methods research studies, researchers can produce meaningful and nuanced data that can inform policy and practice in a wide range of fields.

Conclusion

In conclusion, mixed methods research requires a philosophical, paradigmatic, and theoretical framework to integrate both qualitative and quantitative data effectively. The integration of data can take various forms, such as using one type of data to aid in the interpretation of the other. The use of multiple data sources also is crucial in mixed methods research because it increases the validity and dependability of the findings through triangulation. This is particularly important when investigating complex social phenomena because it allows for a more nuanced and comprehensive understanding of the topic. Moreover, mixed methods research provides researchers with the opportunity to investigate the topic from multiple perspectives, leading to a more balanced perspective on the research question. This method has the potential to contribute to a more robust understanding of complex social

phenomena, which can have policy and practice implications. In addition, the selection of the target population and study sample is essential in mixed methods research to ensure the validity and generalizability of the findings. Researchers should carefully consider the potential advantages and disadvantages of using the same sample or informants depending on the research context. Utilizing a variety of sampling techniques also can help to reduce potential biases and increase the generalizability of the findings.

Overall, researchers should regard mixed methods research as a valuable strategy that offers more robust and exhaustive findings, with implications for practice. By integrating qualitative and quantitative methods, researchers can obtain a more comprehensive understanding of complex phenomena, leading to better-informed decisions.

A contribution to mixed method research

This article makes a significant contribution to mixed method research by dispelling some persistent myths and misunderstandings surrounding it. It aims to highlight the essential properties and advantages of mixed methods research, which are often misunderstood and misused. The article starts out by describing mixed methods research and elaborating on why it is so crucial to the study of social phenomena. It stresses the complexity and sophistication of mixed methods research as opposed to a simple mixture of qualitative and quantitative methods. In addition, the article states that mixed methods research combines quantitative and qualitative information.

Several misconceptions and fallacies concerning mixed methods research are debunked throughout the remainder of the article. For instance, it challenges the idea that one method must predominate over another in mixed methods studies and that quantitative research is inherently more reliable than qualitative. Targeting and sampling are discussed, along with how the accuracy of different approaches to data collecting varies.

The article ends by stressing the significance of using various independent data sets and developing a philosophical, paradigmatic, and theoretical framework to combine quantitative and qualitative data in mixed methods research. It also highlights the significance of selecting an appropriate population and sample for the study in order to ensure its generalizability and provides strategies for avoiding the misconceptions.

Overall, this article makes a significant addition to the research community by debunking myths and misunderstandings concerning mixed methods research studies and outlining best practices for conducting such studies. Particularly helpful in ensuring the validity and reliability of research findings is the emphasis on the need of a philosophical, paradigmatic, and theoretical framework, as well as the use of numerous independent data sets.

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