Global Academic Journal of Linguistics and Literature

Available online at https://gajrc.com/journal/gajll/home
DOI: 10.36348/gajll.2023.v05i01.002

OPEN ACCESS

ISSN 2706-9028 (P)
ISSN 2707-2541 (O)

Original Research Article

Exploring the Mixed Methods Research Design: Types, Purposes, Strengths, Challenges, and Criticisms

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Article History
Received: 07.12.2022
Accepted: 16.01.2023
Published: 20.01.2023

Abstract: A mixed methods research design, which is a complex approach, combines both quantitative and qualitative data in a single study or succession of studies. This design can be particularly functional for exploring complex research questions that cannot be fully answered by using a single research design. Moreover, a mixed methods design is necessary to examine the relationships between different variables because examining the relationships between diverse variables is not viable just through a single research design. This design is required to complement and cater to the increasingly multifarious requirements of contemporary researchers. This article, which explores and discusses types, purposes, strengths, challenges and criticisms of the mixed methods research design as its objectives, stems from an analysis of some notable works in the field. It is grounded on the secondary qualitative data accumulated in the forms of words from journal articles and books related to the research designs. It assists the novices in the field of research in particular and other researchers in general by providing them with an overview of mixed methods design along with its types, such as convergent parallel, explanatory sequential, exploratory sequential, embedded, transformative and multi-phage designs.

Keywords: Benefits, challenges, criticism, mixed methods research designs.

1. INTRODUCTION

Research is a systematic and in-depth study of a specific topic or problem in order to gain new knowledge, comprehend underlying principles, and identify patterns or trends. It is an investigative process that involves collecting, analyzing, and interpreting data or information from a variety of sources. It is an intellectual and creative activity (Best & Kahn, 2010), and a search of knowledge (Kothari & Garg, 2014). Such a creative activity or search of knowledge can be accomplished with the help of a research design. Research design is the overall plan which provides specific direction for procedures in a research (Creswell, 2014; Kerlinger, 1986). The research design is primarily guided by a research paradigm. A research paradigm is a philosophical aspect about the world or the nature of reality and it guides us how we approach it to comprehend it (Maxwell, 2005). It refers to the underlying assumptions and beliefs that guide a research study. Mixed methods research design, which is based on the pragmatic worldview (Tashakkori & Teddlie, 2010), allows the combination of qualitative and quantitative methods. There are primarily six types of research designs under the mixed methods research design: convergent parallel, explanatory sequential, exploratory sequential, embedded, transformative, and multi-phase designs. Mixed methods research is also called 'quantitative and qualitative methods'

(Fielding & Fielding, 1986). It acknowledges the approach that is actually a combination of methods. It is termed 'hybrid research' (Ragin, Nagel, & White, 2004), 'combined research' (Creswell, 1994) or 'methodological triangulation' (Morse, 1991). There are some benefits and challenges of using the mixed methods research designs; however this approach has gained popularity in recent years because it allows researchers to take advantage of the strengths of both qualitative and quantitative methods and to address research questions in a more comprehensive way.

This article explores and discusses the types of the mixed methods research design in a precise and concise way in order to assist researchers for choosing an appropriate research design to bring forth research studies reliably and validly in the fields of their interest.

2. LITERATURE REVIEW

Literature review fundamentally involves types of the mixed methods research designs along with their purposes, strengths and challenges. Review also includes the criticisms regarding the mixed methods design.

2.1 Mixed Methods Research Designs

Several writers working in different disciplines and countries maintain that the mixed methods commenced from the late 1980s. Writers from sociology in the United States (Brewer & Hunter, 1989) and in the United Kingdom (Fielding & Fielding, 1986); from evaluation in the United States (Greene, Caracelli, & Graham, 1989); from management in the United Kingdom (Bryman, 1988); from nursing in Canada (Morse, 1991); from medicine in the United States (Crabtree & Miller, 1992); and from education in the United States (Creswell , 1994) all sketched out that the mixed methods initiated from the late 1980s to the early 1990s.

Mixed methods research designs involve the combination of qualitative and quantitative research methods in a particular study. Mixed methods research may be the correct choice when the research process specifies that quantitative or qualitative data alone cannot sufficiently answer the research question**.** It takes on a two-phase project (Creswell, 2014). Mixed-method designs proffer many advantages for approaching complex research questions because they incorporate both post-positivist and interpretivist philosophical frameworks (Fetters, 2016). It also provides a logical basis, methodological suppleness, and a profound understanding of small cases (Maxwell, 2016). The use of mixed methods enables researchers to answer research questions with adequate depth and width (Enosh, Tzafrir, & Stolovy, 2014) and assists to generalize findings and implications of the researched issues to the whole population. It embraces multiple ways of seeing and hearing (Greene, 2007).

2.2 When to Conduct the Mixed Methods Design

Researchers conduct a mixed methods research design when they have both quantitative and qualitative data as both types of data, jointly, supply better understanding of the research problem. It is an appropriate design if they search for building on the strengths of both data. Mixing of two types of data makes an extremely powerful mix (Miles & Huberman, 1994) and enables us to develop an intricate picture of societal phenomenon (Greene & Caracelli, 1997). The researchers also carry out a mixed methods study when one type of data is not sufficient to address the research problem. Moreover, it is used to provide an alternative viewpoint in a study.

2.3 Reasons for Using Mixed Methods Research Design

Using both qualitative and quantitative methods in research can offer a more comprehensive understanding of a research phenomenon. This is because MMR allows researchers to gather and integrate multiple data sources to study complex problems (Poth & Munce, 2020) and gives them the ability to view a problem from different perspectives and research lenses (Shorten & Smith, 2017). It also allows researchers to consolidate data in a purposeful way, enabling them to gain a wider view of their study. The combination of closed-ended quantitative data and open-ended qualitative data can also be useful in understanding a research problem (Creswell, 2003).

Employing both data sets allows the researchers to answer the same research question with greater certainty and wider implications in the conclusion (Maxwell, 2016; Morgan, 2014). Mixing two methods can produce a more complete picture and provide a greater variety of divergent or complementary views, which can enhance our understanding of a phenomenon and open up new avenues for future research (Teddlie & Tashakkori, 2009). Additionally, mixed-methods research can provide a holistic view of a phenomenon and offer insights into different components of the phenomenon, potentially leading to the development of substantive theories (Venkatesh, Brown, & Bala, 2013).

An MMR approach is a way of combining both qualitative and quantitative methods in order to overcome the differences between these two paradigms and provide a more reliable way of

obtaining knowledge (Teddlie & Tashakkori, 2009; Bergman, 2008). By using both methods, the strengths of one method can compensate for the weaknesses of the other, leading to more rigorous conclusions (Clark & Ivankova, 2016). One key aspect of an MMR approach is data triangulation, which involves comparing the findings from one method (Bergman, 2008) to those obtained from another (Clark & Ivankova, 2016) in order to validate the results and obtain a more complete understanding of the research issue (Teddlie & Tashakkori, 2009). This process of triangulation can lead to stronger inferences and increase the credibility of the conclusions drawn from the research (Venkatesh, Brown, & Bala, 2013). The rationale for combining the two methods is to create more accurate and nuanced conclusions by using the results from one method, either qualitative or quantitative, to guide or influence the application of the other method either qualitative or quantitative method (Clark & Ivankova, 2016).

2.4 Process of the Mixed Methods Research Design

The process of using a mixed methods research design typically involves the following steps:

Defining the research questions and objectives: The first step involves defining the research questions, and setting specific objectives of the study.

Choosing the research design: In this step, researchers make a decision about the use of the specific mixed methods design.

Collecting data: Researchers collect both quantitative and qualitative data using the methods chosen in the research design. This may involve administering surveys, conducting interviews, conducting observations, or other types of collecting data.

Analyzing the data: The quantitative data are analyzed by using statistical techniques, whereas the qualitative data are analyzed by using methods such as coding and thematic analysis.

Integrating the findings: The findings from both the quantitative and qualitative data are integrated and synthesized in such a way that provides a holistic understanding of the research problem.

Drawing conclusions and making recommendations: Based on the combined findings from the quantitative and qualitative data, conclusions are drawn and recommendations are made for future research.

Reporting the findings: The findings of the study are reported in a research report or academic publication. This typically includes a detailed description of the research design, the presentation of the results, and discussion of the implications and limitations of the study.

2.5 Purposes of Mixed Methods Research Design

Mixed methods research is a research design that involves collecting, analyzing, and integrating both quantitative and qualitative data in a particular study or series of studies. Quantitative research is regarded as a deductive approach and qualitative as an inductive approach towards research (Rovai, Baker, & Ponton, 2014). Qualitative data are subjective in nature (Tracey, 2013). There are several purposes for using a mixed methods research design;

To triangulate data: By accumulating and analyzing both quantitative and qualitative data, researchers triangulate their findings, which means that they can use multiple sources of evidence to confirm or clarify their results. Data triangulation in a mixed-methods study is generally accepted as a strategy for validating results obtained through the individual method (Bergman, 2008).

To enrich the findings of a study: By collecting and analyzing both quantitative and qualitative data, researchers gain a more entire understanding of the research problem and the phenomena under investigation.

To explore and explain complex phenomena: Mixed methods research is mainly well-suited for studying complex phenomena that cannot be adequately understood using a single research method.

To increase the validity and reliability of the findings: By using multiple methods to collect and analyze data, researchers increase the validity and reliability of their findings, as each method provides a different point of view on the research problem.

To provide a holistic view of the research problem: Mixed methods research allows researchers to reflect on both the extensive, overall patterns and trends in the data (quantitative) and the meaning and context behind those patterns and trends (qualitative).

2.6 Strengths of Mixed Methods Research Design

A mixed-methods design offers a number of benefits, such as a logical foundation, flexibility in methodology, and a deeper understanding of small cases (Maxwell, 2016). It also allows researchers to thoroughly answer research questions and

generalize their findings and implications to the broader population (Enosh, Tzafrir, & Stolovy, 2014). This approach is informed by both post-positivist and interpretivist philosophical frameworks (Fetters, 2016).

Triangulation is a research strategy that involves using multiple methods or sources of data to gain a more comprehensive understanding of a research problem or to test the validity of findings (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). A mixed-methods design, therefore, offers the best chance of answering research questions. It combines the strengths of different methods while compensating for their weaknesses, and offers the best chance of answering research questions effectively (Johnson & Onwuegbuzie, 2004). It is becoming increasingly important to address the impact in research (Saville, 2012). There is a lot of literature on mixed-methods research design (Bryman, 2012; Creswell & Clark, 2018; Johnson & Onwuegbuzie, 2004; Maxwell, 2016; Morgan, 2014; Tashakkori & Teddlie, 1998). However, it appears that there is not much literature available to help early career researchers to choose the right mixed-methods design for their study and understand the reasoning behind it. The strengths of using a mixed methods research design are as follows:

Complete understanding of the research problem: By collecting and analyzing both quantitative and qualitative data, researchers gain a more comprehensive understanding of the research problem and the phenomena under investigation.

Triangulation of data: Using multiple methods to collect and analyze data permit researchers to triangulate their findings, which means that they can use multiple sources of evidence to confirm or clarify their results.

Increase in validity and reliability of the findings: Using multiple methods to collect and analyze data increases the validity and reliability of the findings, because each method provides a different perspective on the research problem.

A holistic view of the research problem: Mixed methods research allows researchers to consider both the broad, overall patterns and trends in the data (quantitative) and the meaning and context behind those patterns and trends (qualitative). It provides a holistic view of the research problem.

Participants' engagement: Inclusion of both quantitative and qualitative data collection methods makes the participants engage in the research studies as it allows them to express their thoughts and experiences.

Researchers' intensive engagement: Employing a mixed methods research design can be more engaging for researchers, as it allows them to use a multiplicity of research methods and analyze data in diverse ways with resulting in the research process more exciting and rewarding.

2.7 Challenges of Mixed Methods Research Design

There are several challenges that researchers tend to encounter when using a mixed methods research design:

Complexity: Mixed methods research can be more complex than a single-method research, as it involves collecting and analyzing data from multiple sources and using multiple research methods. This can make the research process more time-consuming and resource-intensive.

Integration challenges: Integrating and synthesizing the findings from both quantitative and qualitative data can be challenging as these two types of data are often analyzed and presented in different ways. Researchers must be careful to ensure that the findings from both methods are accurately and fairly represented in the final study.

Limited generalizability: Depending on the research design and methods used, mixed methods research may not be generalizable to a wider population. This can be a concern if the study sample is not representative of the population of interest.

Limited replicability: Mixed methods research can be intricate to replicate, as it involves multiple methods and often relies on subjective data interpretation. This can create it challenging for other researchers to replicate the study and validate the findings.

Biasness: Researchers may bring their own biases and assumptions to the study, which can influence the data collection and analysis process. This can be an apprehension in both quantitative and qualitative research, and it is imperative for researchers to take steps to minimize biasness.

2.8 Types of Mixed Methods Design

The common types of the mixed methods research are as follows:

2.8.1 Convergent Parallel Design

Creswell (2014) outlines that convergent is a mixed methods strategy in which a researcher collects both quantitative and qualitative data, analyzes them separately, and then compares the results to make out if the findings substantiate or disconfirm each other. The intent of the convergent

design is to obtain different but complementary data on the same topic (Morse, 1991) in order to best understand the research problem.

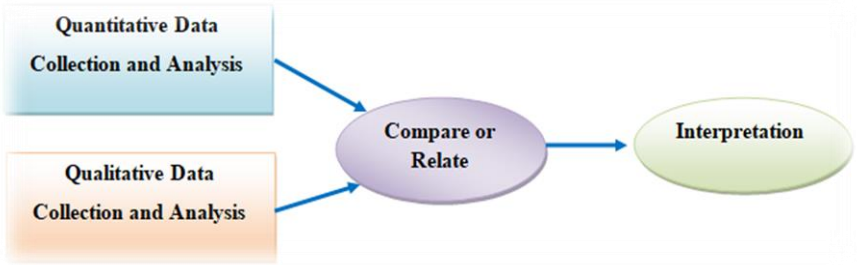

Figure 1: Convergent parallel design (Adapted from Creswell & Clark, 2011)

Purposes

Purposes of the convergent parallel design are to obtain a more complete understanding from two databases, corroborate results from different methods and compare multiple levels within a system.

Strengths

This design is intuitive and efficient. It combines the advantages of each form of data with the potentialities of generalizability and information.

Challenges

Convergent design requires substantial effort and expertise. There are issues related to the samples and sample sizes. It is difficult to converge two sets of different data. How to resolve discrepant results is difficult.

2.8.2 Explanatory Sequential Design

Creswell (2014) maintains that explanatory is a mixed methods approach that involves a two-phase project in which the researcher accumulates quantitative data in the first stage, analyzes the outcomes, and then uses the outcomes to plan or construct into the second qualitative stage.

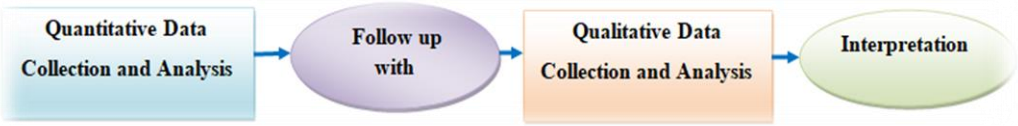

Figure 2: Explanatory sequential design (Adapted from Creswell & Clark, 2011)

Purposes

Objectives of the explanatory design are to use qualitative data to help explain quantitative results that need further exploration, and use quantitative results to purposefully select best participants for qualitative study.

Strengths

Strengths of this design involve appealing to quantitative researchers. It is straightforward to implement two phases. It lends itself to emergent approaches.

Challenges

Explanatory design involves two phases that require lengthy time to implement. It needs to decide what results to follow up. It must decide criteria for selecting participants. It needs to contact participants for a second round of data collection.

2.8.3 Exploratory Sequential Design

In this design, at first, the qualitative data are collected and analyzed, and later quantitative data are collected and tested (Schoonenboom & Johnson, 2017; Shorten & Smith, 2017). Quantitative measures or instruments are built up after the qualitative findings (Terrell, 2012; Wisdom & Creswell, 2013).

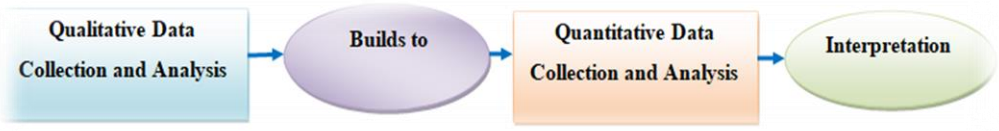

Figure 3: Exploratory sequential design (Adapted from Creswell & Clark, 2011)

Purposes

Purposes for the exploratory design are to first explore variables, theories, hypotheses that are not known, develop an instrument or typology that is not available and assess whether qualitative themes generalize to a population or not.

Strengths

It is straightforward to design, implement, and report. Quantitative component can make the qualitative approach more acceptable to quantitative-biased audiences. Researchers produce a product, such as an instrument. It lends itself to emergent approaches.

Challenges

Exploratory design involves two phases that require prolonged time to implement. Deciding the qualitative findings to use for a quantitative phase is challenging. It has a challenge to set procedures for developing a valid and reliable instrument.

2.8.4 Embedded Design

In an embedded design, one technique of enquiry is done in a supportive secondary function which facilitates researchers and readers to construct a sense of the study in its sum. It inquires expansion, supporting, enrichment, illustration and elucidation of the results from one method using the outcomes from the other approach. This design holds its strength to unite the advantages of both the quantitative data and the qualitative data (Creswell, 2012).

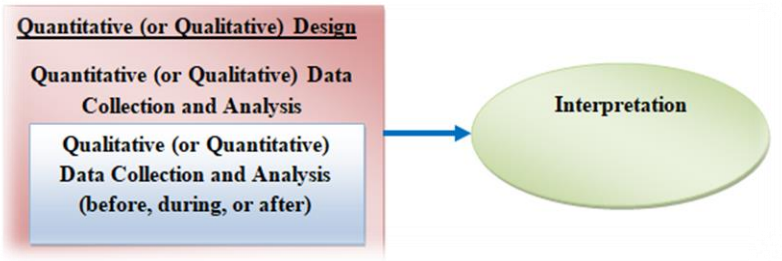

Figure 4: Embedded design (Adapted from Creswell & Clark, 2011)

Purposes

Purposes for the embedded design are to address different questions that call for different methods, enhance an experiment such as by improving recruitment procedures, examine the intervention process and explain reactions to the participation.

Strengths

This design may require less time and fewer resources. It improves the larger design with supplemental data. It fits a team approach well and may be able to publish results separately. It keeps appealing to those accustomed to traditional designs.

Challenges

Embedded design needs expertise in primary design and mixed methods. It must specify a purpose for collecting the supplemental data. It must decide when to collect supplemental data. Results are difficult to integrate. It must consider treatment biasness if qualitative data are collected during experiment.

2.8.5 Transformative Mixed methods Design

Transformative mixed methods design is a research design that entails collecting and analyzing data using both qualitative and quantitative methods with the purpose of achieving a transformative understanding of the research question. It is based on the idea that the research process itself can be transformative, and that the research findings can have a transformative effect on the individuals or society being studied. The strength of this design is that it is value-oriented and ideological (Greene , 2007).

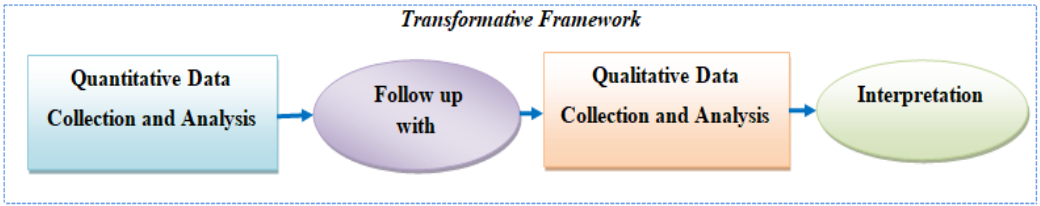

Figure 5: Transformative mixed methods design (Adapted from Creswell & Clark, 2011)

Purposes

The purposes of the transformative mixed methods designs are to explore a phenomenon from multiple perspectives and capture a fuller range of experiences and perspectives, challenge dominant paradigms or develop new theories or practices based on a more comprehensive understanding of a phenomenon, shed light on issues of social justice and advocate for change in policies or practices that are harmful or inequitable, facilitate dialogue and collaboration between researchers and stakeholders, such as community members, policy makers, or practitioners. It is a flexible and adaptive research approach that can be used to address complex and multifaceted research questions and promote social change.

Strengths

It is a research approach that combines qualitative and quantitative methods in a way that aims at transforming or challenging existing theories, practices, or viewpoints. It is a relatively new approach that has been applied in a variety of disciplines. Its strengths lie in providing comprehensive understanding of complex phenomena, challenging dominant paradigms and promoting social justice, facilitating dialogue and collaboration between researchers and stakeholders, and offering flexibility and adaptability: It is a flexible approach that can be adapted to fit the needs of different research questions and contexts. It allows researchers to be creative and to tailor their research design to the specific needs of their study.

Challenges

Although it is a powerful and innovative approach, it poses the challenges like complexity in nature, limited availability of resources, lack of familiarity, and ethical considerations. Researchers must be mindful of these issues and take appropriate measures to protect the welfare of participants.

2.8.6 Multi-phase Mixed Design

It is a research design that takes on collecting and analyzing data using both qualitative and quantitative methods in multiple phases. Its goal is to provide a more complete and accurate understanding of the research question by collecting and analyzing data from both qualitative and quantitative sources in multiple phases. It is to address a set of incremental research questions that all advance one programmatic research object (Creswell & Clark, 2011).

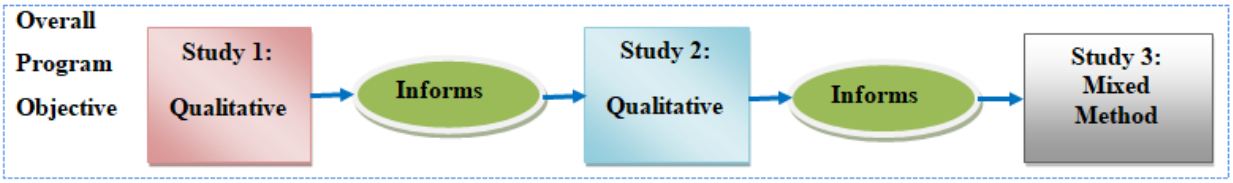

Figure 6: Multi-phase mixed design (Adapted from Creswell & Clark, 2011)

Purposes

Purposes of this design are to explore and understand complex phenomena, answer research questions that require both qualitative and quantitative data, collect and analyze both types of data in a structured way, validate findings and increase reliability, adapt and refine the research design and explore complex phenomena and answer research questions that require multiple methods and perspectives.

Strengths

The strengths of the multi-phase design are triangulation of their results, flexibility in gaining new information, richness of data, opportunities for iteration, and a deeper understanding of the research.

Challenges

Using the mixed methods design undergoes the challenges like complexity in combing data, limited availability of resources, ethical considerations, time consuming in data collection and analysis, and challenges in data analysis.

3. METHOD AND MATERIALS

Words, phrases or language written or documented in journal articles and books on research design are the secondary data that were employed to write this review article. This article grounded on the qualitative research uses all the terms related to research designs as the materials for research.

4. Criticism of Mixed Methods Research

Despite the fact that the mixed methods research design provides a more comprehensive understanding of a research problem by blending both qualitative and quantitative data collection and analysis techniques in a single study, it is not free from critical remarks. Some of the criticisms regarding the mixed methods research involve

difficulty in integrating the results from the diverse methods, time-consuming and resource-intensive in data collection and analysis, and biasness in data analysis procedure.

There is a debate among researchers about the use of both qualitative and quantitative methods in a single study. Some argue that uniting two approaches is incompatible (Hammersley, 1996) due to differences in their assumptions about reality, truth, and the relationship between the researcher and the research subject (Smith, 1983). In this design, one paradigm preludes the other (Guba, 1987). Others believe that the use of both methods can be beneficial, as they offer complementary insights. It is necessary to blend both types of data in order to develop a more complete understanding of the topic (Wittink, Barg, & Gallo, 2006).

Mixed-methods research does not retain sufficient data and analysis to support its conclusions (Wilkinson & Staley, 2019) by trying to accomplish too much in one study by combining qualitative and quantitative methods (Hammersley, 2014). Despite these challenges, there has been a trend towards using mixed-methods, which combines both qualitative and quantitative approaches. Researchers normally give priority to one method, but all researchers can benefit from using multiple methods (Bryman, 2012). Different research paradigms, previously thought to be incompatible, can now be seen as informing each other when viewed through the lens of eclecticism (Lincoln & Guba, 2000). These criticisms highlight both strengths and flaws of the mixed methods research design.

5. CONCLUSION

Mixed methods research design involves collecting and analyzing both qualitative and quantitative data within the same study. There are several different types of mixed methods research design, such as convergent parallel, explanatory sequential, exploratory sequential, embedded, transformative, multi-phase mixed methods and so on. Each of these designs has its own strengths and limitations, and the appropriate design will depend on the research question and context. Convergent parallel design involves collecting and analyzing both types of data concurrently with the aim of triangulating findings and increasing the validity and reliability of the research. Explanatory sequential design takes on collecting and analyzing quantitative and qualitative data sequentially with the aim of building upon and explaining the findings of the initial phase of data collection. The embedded design is useful for apprehending complex systems and processes, and for studying groups or communities that are difficult to access or observe from the outside. It is also useful for studying groups that are in flux or undergoing change, as the researcher is able to document and analyze these changes as they happen. Transformative research design seeks to challenge and transform existing ways of thinking and acting. It is characterized by a focus on empowering and enabling individuals and communities to effect change and promote social justice. Multi-phase mixed methods research design involves collecting and analyzing both types of data at multiple points to refine the research question and methods. It can provide a more comprehensive and nuanced understanding of research questions and phenomena, and is a useful approach for researchers who are looking to incorporate multiple perspectives and methods in their studies. This article poses that every research design has its purposes, strengths and challenges. Researchers must be mindful of using an appropriate research design for conducting research studies. This article through over viewing the types of the mixed methods research design intends to assist the researchers in choosing a reliable and valid mixed methods research design in the field of their interest.

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