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Martyna Elerian

The search for understanding of Mixed Method Research among Graduate students. A Case of Learners in the School of Continuing and Distance Education, University of Nairobi, Kenya

by

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Abstract

The desire by students and researchers to engage in interdisciplinary research has forced many of them to adopt mixed method research. A combination of both quantitative and qualitative approaches/paradigms enables the researcher to tap into the strengths of each as well as minimizing the weaknesses of both in a single study. A paradigm dictates the opinions, assumptions and beliefs a researcher holds about the world around them and their view of what constitutes knowledge and truth. Opposing views about the nature of knowledge (Epistemology), the role of values (axiology) and the nature of reality (ontology) caused emergence of the paradigms. The types of assumptions and practices held by individual researchers often leads a researcher taking on a qualitative, quantitative or mixed methods approach in their research study. The School of Continuing and Distance Education (SCDE) formerly School of Open and Distance Learning (SODL) offers a Masters Degree and PhD in Project Planning and Management. Due to the multi-faceted issues investigated by the graduate students, majority of them opt to adopt mixed method approaches in their research work. However, a review of some of the graduate proposals has shown a lack of understanding among the students on the coherence between mixed method paradigm and the designs emanating from this paradigm. The purpose of this paper is to review mixed method research and mixed method approaches in a simple and systematic manner. The paper will identify different types of mixed method designs based on weighting and timing. Finally, the paper will end by recommending pertinent questions that a researcher needs to ask themselves before embarking on a mixed method study.

Key words:

Quantitative research, Qualitative research, Mixed Method Research, Research Paradigm

1. Introduction

Education, more so, higher education is considered one of the biggest instruments for development; a means for realizing personal growth in addition to broader social, cultural, economic and political needs and aspirations of a society. In Kenya, the quest for higher education has been overwhelming. This quest is a result of the seemingly awesome benefits to individuals who pursues higher. This coupled with emergence of technology and online learning has created a demand for higher education not only for the young students but also among adults and tertiary age school graduates.

Institutions of higher learning need to continuously employ strategies that will produce quality graduates who are ready for the job market and further education by focusing on refining their approach to teaching and learning. One of the aspect is the supervision of graduate students. The number of graduate students who graduate in a particular year is always small compared to the other levels. Table 1.1 shows a summary of awards at the University of Nairobi in 2018 and 2019.

Table 1.1: Summary of Graduands in 2018 and 2019

AWARD	2018		2019	
	NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
Diploma	592	14.52	830	9.16
Bachelor Degree	2,868	72.92	6,015	66.38
Post-graduate Diploma	14	0.36	50	0.55
Master's Degree	405	10.3	2,097	23.14
Fellowships	-		8	0.08
Doctor of Philosophy Degree	73	1.85	61	0.67
Doctor of Science Degree	1	0.03	-	-
TOTAL	3,933	100.0	9,061	100.0

Source: The 59th and 60th Congregation for the Conferment of Degrees and award of Diplomas Booklet of the University of Nairobi

Out of the total numbers shown in Table 1.1, the School of Continuing and Distance Education graduated 182 Masters Degree and 6 PhD Degree in 2018 and 252 Master Degree and 8 PhD Degree in 2019 (University of Nairobi, 2018 and 2019). All the

fourteen (14) PhD students used mixed method research in their methodology. However, a review of some of these thesis shows a lack of comprehension of the pragmatist paradigm as shown by the excerpts below from three PhD theses. The excerpts shows only the paradigm and design which are part of Chapter Three on Research Methodology as they are the sections of interest in this paper.

Theses 1 (2019):

Research Paradigm

This study adopted the Pragmatic Paradigm which provided an opportunity for wider and various worldview and dissimilar assumptions, as well as different forms of data collection and analysis using the mixed methods approach (Creswell, 2003). The research paradigm is preferred to other paradigms mainly because it provides for the use of both qualitative and quantitative research methodologies to collect information and make inquiry into complex phenomenon of social and natural contexts (Creswell, 2009; Morgan, 2007)...

Research Design

This study used a descriptive survey research design. The descriptive research design proposed in this study helped to explore the link between the variables and report the way it is (Brook, 2013). It further allowed a multifaceted approach for data collection that made it possible to scan the views of project professionals on reduction of construction cost overruns in real estate projects.

Theses 2 (2019):

Research Paradigm

Research paradigm refers to a combination of researcher's beliefs surrounding an action (Guba, 1990 in Creswell, 2009). The most appropriate paradigm for this study will be pragmatism. Pragmatism is not based on any one system of philosophy and reality. Therefore, a researcher has the advantage of using both quantitative and qualitative assumptions during research. In addition, proponents of pragmatism argue that the researcher has the freedom of choice hence free to choose from the methods, techniques and procedures of research that best meet their assumptions (Cherryholmes, 1992). ...

Research Design

The study shall employ cross-sectional research design. Cross-sectional study design will be the preferred design because it is cost effective compared to longitudinal studies. Both quantitative and qualitative data, therefore mixed methods approach shall be applied. Both quantitative and qualitative data will be concurrently collected within a pre-determined period of one month (Creswell, 2009)...

Theses 3 (2018):

Research Paradigm

The study adopted the paradigm of pragmatism as proposed by Charles Sanders Peirce, William James and John Dewey (1859-1952, 2008). This method is important in assisting the researcher in bridging the various barriers concerned with the study and getting the required information concerning the variables under study. Morgan (2013) argues that the mixed methods of research is important in assisting the study understand the various behaviour and understandings of the various segments within the area of study...

Research Design

With reference to Coopers and Schindler (2011) research designs are defined as the schedules that the researcher will use while collecting the required information that is needed to achieve the objectives of the study been undertaken. Based on this analogy, the study adopted descriptive survey research design that allowed the researcher to utilize quantitative and qualitative methods of data collection and analysis...

These three excerpts clearly shows disconnect between the paradigm and the design. The three students adopted pragmatism paradigm but the designs chosen are from one approach which is quantitative. It is in this view that the objective of this paper is to synthesis the mixed method research literature in order to assist graduate students appreciate this type of research.

2. Methodology

This paper adopted a desktop review methodology. A desktop review was carried out to identify features of quantitative, qualitative and mixed method research. A review of literature related to strengths and weaknesses of each paradigm was also carried out to augment the postulates of each paradigm. Finally, the authors presented the various methods and approaches that a researchers can use in a mixed method study.

3. Quantitative, Qualitative and Mixed Method Research

Research methodology has continued to evolve and develop over the years. However, the discourse among scholars on which among the qualitative and quantitate approaches is ideal has persisted. The quantitative/positivists advocates argue that reality is one, objective and independent of who is observing it. Therefore, through scientific methods, the researcher should maintain a distance with the researched to avoid bias. Thus researchers should not emotionally immerse themselves in the study and should justify the stated hypotheses (Johnson and

Onwuegbuzie, 2004). This justification avoids use of personal voice 'I' but rather adopts formal 'scientific language'. These are the thoughts of the positivist paradigm or philosophy whose purpose is to explain, predict and control/intervene phenomena. This is done through focused collection of numerical data that is generalizable beyond the research setting.

In rejection of the positivist paradigm are the qualitative advocates also referred to as constructivists and interpretivists. Constructivists hold that there is no one objective reality that is waiting to be discovered. Realities are multiple and each researcher constructs his/her reality in different ways. This paradigm suggests that perceptual frames or mental maps shape how researchers think about research (Guba, 1990). In this philosophy, the researcher needs to immerse himself in the natural setting of the phenomena, become an inside and provide an in-depth, thick and detailed description of the phenomena through intensive collection of narrative data. Therefore the researcher and the researched cannot be separated. The researcher is free to bring in his bias or that of the phenomena. This philosophy rejects the use of 'scientific language' but adopts the use of the personal voice 'I'.

Finally are the mixed methods advocates who are pragmatic in nature. A mixed method researcher does not subscribe to one way of collecting and analyzing data. Rather, they combine both the qualitative or quantitative approaches. In its inquiry, it uses both induction and deduction. Induction is an inquiry that forms conclusions from a particular observation. This results in development of theories and discovery of patterns. Deduction concerns itself with testing theories and hypotheses to explain the occurrence of an observation. The inquiry moves from general to particular. This paper agrees with the general characteristics (Johnson and Onwuegbuzie, 2004) of pragmatism.

1. Knowledge is developed from the experiences of the world we live on;
2. Truth is not constant. The current truth is tentative and changes over time;
3. Some truths are more true than others;
4. Workability of a theory is based on how well the theory is applicable in a certain situation;
5. The world is viewed in entirety. Each aspect of the world, be it the natural, physical, social and psychological should be studied.

Mixed methods research is not without strengths and limitations. Some of the strengths are:

1. Narratives and pictures from qualitative research adds meaning to numbers while numbers from quantitative research adds exactitude to narratives and pictures.
2. A broader range of research questions can be answered using mixed method research.
3. There is stronger evidence for conclusion and recommendations due to convergence and corroboration of findings of a mixed method study provide; and
4. Insights that can be missed in a single method are brought to light in a mixed method research.

Pragmatism has limitations too. Some of the limitations are:

1. It takes more time and resources to plan than when using a single study. This may discourage students who have limited time to complete their thesis within a stipulated time period.
2. Findings from one paradigm may contradict the other paradigm. It becomes unclear how such discrepancies should be resolved.

4. Explanation of Mixed Methods Research

Mixed methods research (MMR) is a blend of ideas from qualitative and quantitative research. It “attempts to consider multiple viewpoints, perspectives, positions and standpoints (always including the standpoints of qualitative and quantitative research”) (Johnson, Onwuegbuzie and Turner 2007, p. 113). The term methods include strategies or methods of data collection, research designs and related philosophical issues (ontology, axiology and epistemology). In this paper, whereas we recognize that there might not be an ideal definition for MMR and also cognizant of the fact that definitions can and will change overtime as the discourse on MMR continues to grow.

The advocates of mixing qualitative and quantitative approaches in a single study or a series of studies argues that it allows construction of multiple and varied research questions. This strategy thus amplifies the strengths of each of the two approaches be it qualitative or quantitative. However, does it mean that mixed methods research produces research findings of higher quality than the single approach? This paper does not aim to create an impression that MMR is the best approach to research study but the researcher should consider the nature of the problem, the nature of research questions , the nature of audience consuming the results and the nature of analysis required before identifying the approach that will guide the study.

Mixed method research carries philosophical assumptions, beliefs and patterns of both qualitative and quantitative research. These assumptions guide data collection, data analysis, interpretation and presentation of findings in a single study or series of studies. The principle idea behind mixing the two approaches is that it provides a better comprehension of research problems than either approach alone (Creswell and Plano Clark, 2007).

This paper defines mixed methods research as a systematic inquiry which mixes both qualitative and quantitative approaches simultaneously or sequentially in a single study or a series of studies in data collection, analysis and interpretation of findings.

5. The Case for Mixed Methods Research

A number of scholars view mixed method research as the paradigm that offers reasonable and practical alternative to answering research questions. This paper highlights five rationales for conducting mixed method research as enumerated by Greene, Caracelli and Graham (1989). These are:

- a) Triangulation -triangulation seeks convergence and confirmation (corroboration) of results;
- b) Complementarity -findings of one approach enhances the findings of the other approach;
- c) Development - findings from one approach advances the other approach. This is especially in sequential designs where the findings of one approach are used to inform the process of the second approach;
- d) Initiation - contradiction that may arise when using one approach helps to reframe the research questions; and
- e) Expansion - mixed method approach expands the scope of the inquiry.

6. The Case against Mixed Methods Research

The argument against mixed methods research tends to be based on either or both of the following arguments:

1. The embedded methods argument -qualitative and quantitate research carries different research strategies with different views on ontology, axiology and epistemology. Therefore, Smith (1983, pp. 12-13) argues that the two approaches are not complimentary because each of the two research approaches has different epistemological inferences. Smith and Heshusius (1986, p. 8) criticizes the integration of the two research approaches because

they presumably ignores the assumptions underlying each of the approaches.

2. The Paradigm argument –quantitative and qualitative research have different belief pattern or paradigm. A paradigm is a set of beliefs or a pattern of beliefs that guides a research study in terms of what should be studied, how data will be collected, and how results will be presented and interpreted. This paradigm argument perceives quantitative and qualitative research approaches as paradigms which are entwined and incompatible. This argument also views paradigms are incommensurable i.e. they are incompatible.

7. Approaches to Mixed Methods Research

The growth of mixed methods research is attributed to the work of Campbell and Fiske (1959) who introduced the concept of triangulation to refer to “multiple operationalism’ in which more than one approach is used in a study. Later, Denzin (1978) came up with a definition of triangulation as well as methods/types of triangulation. Triangulation is defined as the combination of one or more research methodologies in the study of a phenomena. There are four types of triangulation.

1. Data triangulation – use of multiple sources of data in a study;
2. Investigator triangulation – use of many but different researchers.
3. Theory triangulation – use of multiple theories to explain the research problem;
4. Methodological triangulation – use of multiple research methods to study a research problem. According to Denzin, there are two types of methodological triangulation; ‘within-methods’ triangulation and ‘between-methods’ triangulation.
 - a) *Within-methods* triangulation. This is also referred to as multi-method research where either two or more quantitative or two or more qualitative approaches are used in a single study. For instance using survey design and experimental design in a single study. These are two quantitative designs in a single study. Or the use of case study design and ethnography design in a single study. Again, these are two qualitative designs used I a single study.
 - b) *Between-methods* triangulation. This is also referred to as as mixed method research where both qualitative and quantitative research approaches are combined in a single study. For instance using survey design and case study design in a single study.

The pertinent question in the two types of methodological triangulation is which is the better one? As has been explained above, in the within-methods triangulation, the weaknesses of the paradigm used are inherent. Therefore, between-method triangulation is a better approach because the strengths of each paradigm will be amplified when the two paradigms are and therefore the result will be a convergence of the strengths of the two approaches.

There are other types of methodological triangulation (Morse, 1991): simultaneous and sequential.

- a) Simultaneous methodological triangulation. This involves the use of the two research approaches at the same time in a single study. In this method, there is limited contact of data sources but the results complement one another during the presentation and interpretation stage.
- b) Sequential methodological triangulation involves sequentially using qualitative and quantitative methods where findings from one method informs the other method.

As the field of mixed methods research continued to grow, four factors have been identified that a researcher should consider when designing a mixed methods study Creswell (2009). These are:

- a) Timing- timing asks the question, will qualitative and quantitative data be collected at the same time or in different phases where findings of one approach informs the other approach.
- b) Weighting - this means which approach is being emphasized
- c) Mixing - this asks two questions:
 - i. When does mixing occur in a mixed methods study? The researcher needs to explain whether mixing will occur at either data collection, data analysis, data interpretation or at all the three phases.
 - ii. How does mixing occur? How the data are mixed means "either qualitative and quantitative data are merged on one end of the continuum, kept separate on the other end of the continuum, or combined in some way between two extremes" (Creswell, 2009, pp. 207-208).
- d) Theorizing or Transforming perspectives -this looks at whether theories are explicit or implicit. A researcher can use a theory or a number of theories in a study. In a mixed methods study, explicit theories determines the type of questions asked, who participates in the study, how data are collected and interpreted.

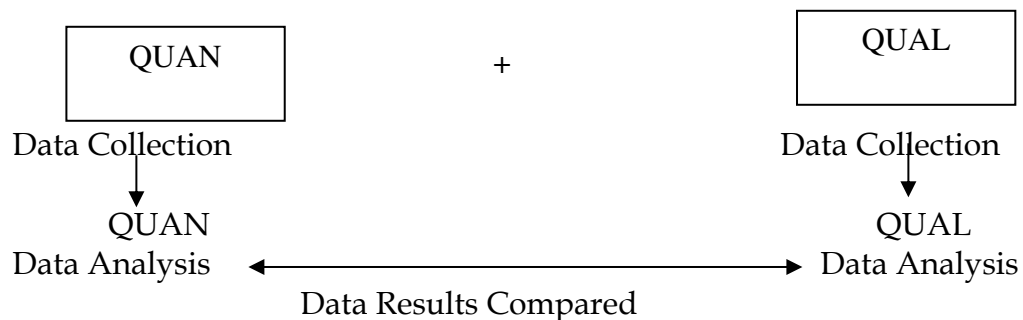
8. Findings

Based on these four factors, four major mixed method strategies are discussed. These strategies are either concurrent or sequential. As earlier stated:

- i. Concurrent is synonymous with simultaneous. In this strategy, both quantitative and qualitative data are collected at the same time in the same study i.e. simultaneously.
- ii. Sequential – in this strategy, one form of approach takes precedence in data collection and analysis i.e. it is given more weight than the other approach. The findings of this approach informs data collection and analysis of the other approach.

Concurrent Strategies

- i. **Concurrent Triangulation Design** – in this strategy, equal importance is given to quantitative and qualitative approaches. Collection and analysis of data are conducted separately but simultaneously. The findings are integrated during presentation, interpretation, and discussion phase of the study.



Example: The researcher uses a *survey design* (quantitative) to assess community participation in implementation of projects and also *observes* (*qualitative*) that practice in their natural setting i.e. where the project is implemented. These two data sets are then analyzed and compared to determine convergence or divergence in community participation.

- ii. **Concurrent Nested or Embedded Design** – in this strategy, there is a main (major) and a minor design. The major approach nests or embeds the minor one i.e. a major qualitative or quantitative design nests or embeds on the minor qualitative or quantitative design in a one data collection phase. Each research method may be answering a different research question. This therefore means that this strategy has a primary method that guides the research and a secondary approach that

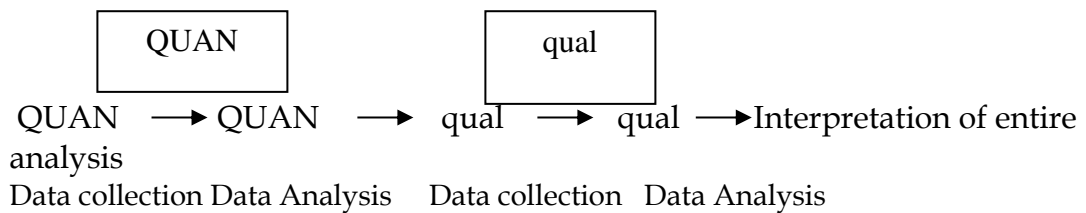
provides a supporting role. Data collected from the two methods quantitative and qualitative (simultaneously) are mixed during analysis.



Example: The researcher collects data to assess people’s knowledge and perceptions about a community project by using a survey questionnaire that mixes open-ended questions for probing (qualitative) and closed ended questions that does not allow probing (quantitative). The two data are integrated and analyzed.

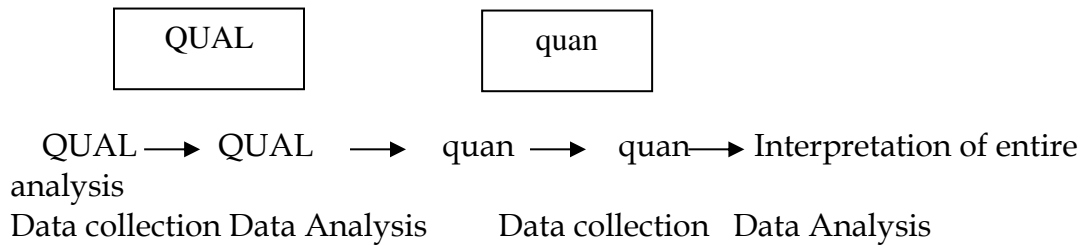
Sequential Strategies

- i. **Sequential Explanatory Design** - this strategy gives priority to the quantitative data. The researcher starts by collecting and analyzing quantitative data followed by collection and analysis of qualitative data. The findings of the quantitative research informs the secondary qualitative data collection.



Example: The researcher collects data through surveys (quantitative) about practices and perceptions of community participation in projects followed by in depth interviews (qualitative) with a few stakeholders who participated in the survey to learn in more detail about their survey responses.

- ii. **Sequential Exploratory Design** - in this design, priority is given to the qualitative data collection. The researcher starts by collecting and analyzing qualitative data followed by collection and analysis of quantitative data. This design is appropriate when in depth investigation of a phenomena is key in the study.



Example: The researcher explores people’s belief and knowledge regarding project sustainability through focus group discussions and in-depth interviews (qualitative). Analysis of this data enables the researcher to construct a survey questionnaire (quantitative) that is administered to a sample (these may be project beneficiaries or stakeholders) from the population

Another mixed method advocate is Bryman. Bryman (2012) proposed nine different approaches in mixed method research. These approaches stems from what Bryman calls ‘the priority-sequence decision principle’.

- i. The priority-decision explains:
 - a) Which of the two research methods is the principle data-collection method is?
 - b) Which of the two research methods have more weight than the other?

- ii. The sequence-decision explains:
 - a) Which of the two method takes prominence i.e. is the qualitative data collection taking prominence followed by the quantitative data collection and vice versa?
 - b) Is the qualitative and quantitate data collection concurrent?

Figure 1 shows the nine approaches. Upper case indicates the main data collection approach. For instance, QUAL indicates that the main research method is

qualitative approach. Lower case indicates the approach that is playing a secondary role.

Arrows refer to sequence. For example $QUAN \rightarrow$ means that quantitative data collection is the main approach i.e. quantitative data collection is undertaken before the qualitative data. Thus, qualitative approach plays a subsidiary role

Plus sign (+) means that quantitative and the qualitative data collection is conducted more or less concurrently.

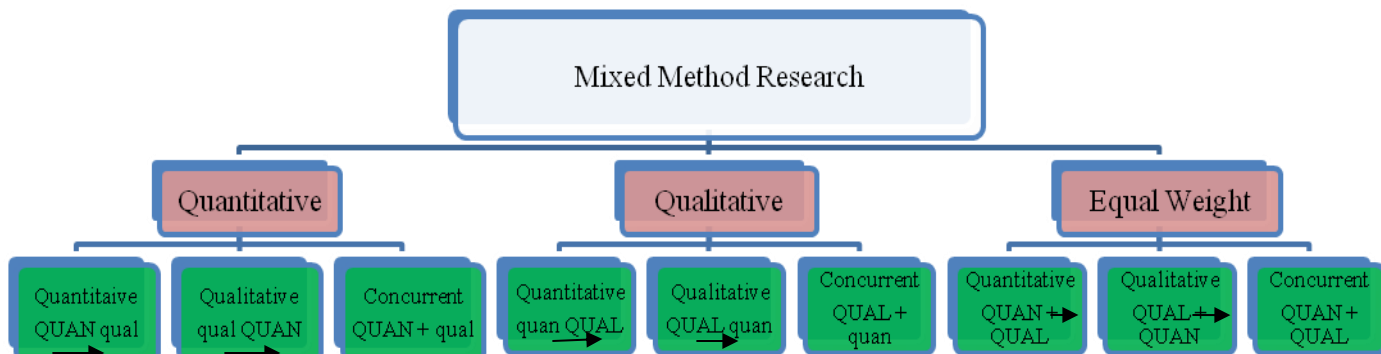


Figure 1: Classifying mixed methods research in terms of priority and sequence (Adopted from Bryman, 2012 p. 632)

Key: Pink indicates Priority while green indicates sequence

Having discussed the various mixed method strategies, the authors of this paper wishes to give suggestions for the appropriate designs that students whose theses were quoted at the introduction would have anchored their research studies on. What is clear is that there is a lack of understanding between multi-method methodological approach and mixed-method approach. As indicated, the three theses adopted pragmatism paradigm but selected designs from the mono methodological approach. Thesis one and three selected descriptive survey which is a quantitative design while thesis two selected cross-sectional design which is a type of survey and therefore a quantitative design. This shows a lack of coherence between the paradigms adopted and the designs chosen. In a multi-methodological approach, the student could have selected two quantitative designs, for instance Survey design and Experimental design; or two qualitative designs, for instance Case Study and Grounded Theory. In a mixed-methodological approach, the student could have mixed quantitative and qualitative methods sequentially or concurrently basing the main design on timing and sequencing as explained in this

paper. The student could thus have selected Survey and Case Study where Survey is the main design while Case Study plays a secondary role and vice versa. Though this is mentioned under recommendations, it is worth pointing out that the philosophy, methodology approach and design are determined by the research problem.

9. Conclusion

This paper has synthesized literature on mixed method research. The authors hope that graduate students will find the paper useful when designing their research. The paper has shown that both approaches are each connected but with distinctive epistemological and ontological assumptions. Though each paradigm is recognized as autonomous, one approach is viewed as complementing the other approach by minimizing its limitations and amplifying its strengths. MMR enables a researcher to view phenomena from different viewpoints. It is in this view that the authors feel that with complex project management issues that students in SODL addresses, mixing approaches offers an opportunity for a more comprehensive understanding of research problems and capture the complexities of phenomena. The decision to mix research methods should be informed by the overall purpose of the research (is it a descriptive, explanatory or exploratory study), the research questions of the study, and the strengths and weaknesses of each research method.

10. Recommendations

Mixed Methods Research is not a matter of using different methods and then combining them to form a whole. MMR should be used only when there is sufficient evidence that once approach is inadequate to led to a clear and concise understanding of the research problem. Therefore before using MMR ensure that you have sufficiently responded to the following questions:

- a) Does the research problem justify the use of MMR? In which way?
- b) Is there coherence between the objectives of the study, the research paradigm and the research design?
- c) Is sampling, data collection and data analysis well aligned with the paradigm?
- d) Are the two paradigms (Quantitative and Qualitative) of equal weight or does one dominate the other?
- e) Is the researcher competent to handle the complexities of conducting MMR?

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Declaration:

- 1. Funding** – this research was not supported by any funding organization. The authors used their own resources to conduct the study
- 2. Conflicts of interest/Competing interests** – N/A
- 3. Availability of data and material** – the authors have ensured that they have acknowledged all the materials they have used in this study.
- 4. Code availability** – N/A

5. **Authors' contributions** (optional: please review the submission guidelines from the journal whether statements are mandatory)