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Article Title: Mixed Methods Research: The Hidden Cracks of the Triangulation Design

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Abstract

Creswell (2009) demystifies Mixed Methods Research by coming up with the Triangulation Design in which the definition of the term triangulation is provided, when to triangulate, data collection procedures, data analysis procedures, the various variants or models and also the strengths and weaknesses of the design. However, there is need to tell how one can tell one type of triangulation from another when using the various models as they do not show when different researchers maybe involved in the collection and analysis of data, when different instruments maybe used or different theories in the interpretation of different phenomena while triangulating. It is also lacking depth in its explanation of the collection, analysis, transformation and interpretation of data when using the models. One needs to clearly get how different one model is from another by looking at the omitted unique aspects in the collection, analysis, transformation and interpretation of data using each of these models. It is also important to indicate that it is costly in time and money to use the Triangulation Design in a study. This paper therefore seeks to point out the aforementioned flaws in Creswell (2009) and expose gaps that future studies can fill for it will be difficult to assess the validity and reliability of the findings if they apply the Design without these critical details.

Key Words: Mixed Methods, Triangulations, Cracks, Models

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SUMMARY OF THE TRIANGULATION DESIGN

It is important for researchers to ask themselves whether their evaluation results are true or credible. When we ask this kind of question we are talking about validity of the evaluation study. Validity in a qualitative research relates to whether the findings of your study are true and certain. “True” in this context means accurately reflecting the real situation and “certain” meaning findings that are backed by evidence hence the results cannot be doubted. Triangulation as a method can be used by qualitative researchers to check and establish validity in their studies. Several scholars have aimed at defining triangulation. Some of them are; Cohen and Manion (2000) who define triangulation as an "attempt to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint; Altrichter et al. (2008) contend that triangulation "gives a more detailed and balanced picture of the situation.”According to O’Donoghue and Punch (2003), triangulation is a “method of cross-checking data from multiple sources to search for regularities in the research data.”Erina Audrey (2013) asserts that triangulation crosschecks information to produce accurate results for certainty in data collection. Creswell (2008) argues that researchers triangulate among different sources of data to enhance accuracy of their study.

From these and other definitions, Triangulation is explained as a research method used in social sciences, it is often used to indicate that two (or more) methods are used in a study in order to check the results. "The concept of triangulation is borrowed from navigational and land surveying techniques that determine a single point in space with the convergence of measurements taken from two other distinct points. Also known as “mixed method” research, triangulation is the act of combining several research methods to study one thing. They overlap each other somewhat, being complimentary at times, contrary at others. This has the effect of balancing each method out and giving a richer and hopefully truer account.“The idea is that one can be more confident with a result if different methods lead to the same result.”

Many scholars portray triangulation as a powerful technique that facilitates validation of data through cross verification from two or more sources. In particular, it refers to the

application and combination of several research methods in the study of the same phenomenon. It can be used in both quantitative (validation) and qualitative (inquiry) studies; it is a method-appropriate strategy of founding the credibility of qualitative analyses; it becomes an alternative to traditional criteria like reliability and validity and it is the preferred line in the social sciences.

Why Triangulate

Many scholars assert that relying solely on one method in research is a big mistake since all research methods has their pros and cons, use of several techniques can be incredibly useful for giving insight into a particular aspect of what you're studying and this is where the concept of "triangulation" comes into its own. Triangulation in qualitative research is done to increase the credibility and validity of the results Schwandt, (1997). It allows researchers to be more confident with their results. This is the overall strength of the multi-method design; it stimulates the creation of inventive methods, new ways of capturing a problem to balance with conventional data-collection methods; helps to uncover the deviant or off-quadrant dimension of a phenomenon since different viewpoints are likely to produce some elements which do not fit a theory or model. Triangulation may also serve as the critical test, by virtue of its qualitative research, it is considered best practice to acknowledge bias and preconceptions. This is what comprehensiveness, for competing theories as well as minimizing bias.

Types of Triangulation

Denzin (1978) identified four basic types of triangulation although some scholars talk of five types; *data triangulation, investigator triangulation, theory triangulation, methodological triangulation* and *environmental triangulation*

Data Triangulation

This type of triangulation involves the use of different data sources/information. It is perhaps the most popular, easiest to implement, and is particularly suited for extension given the different sources.

Methodological Triangulation

Methodological triangulation involves the use of multiple qualitative and/or quantitative methods to study a phenomenon. Such methods can be interviews, observations, documents analysis, or any other feasible method. If the findings from all the methods draw the same or similar conclusions, then the validity in the findings has been established. This is a popular method of triangulation that is widely used. However, in practice, this method may require more resources in order to carry out the study through different methods.

Investigator Triangulation

This type of triangulation involves using several different investigators in a given study. In order to triangulate, each different evaluator would study the issue of concern using the same qualitative method (interview, observation, case study, of focus groups). The findings from each evaluator would be compared. If the findings of each evaluator arrive at the same conclusion, then validity had been established. If the conclusion differs substantially, then further study is warranted to uncover the “true” “and certain” finding.

Theory Triangulation

Theory triangulation involves the use of multiple professional perspectives to interpret a single set of data/information. It typically entails typically using professionals outside your field of study unlike the investigator triangulation. These professionals need to be from different discipline of from the same discipline but at different positions. It is believed that individuals from different disciplines or positions bring different perspectives. Therefore, if each individual from each discipline or position interprets the same information in the same way as the other interpreters (draws the same conclusions), then validity is established.

Environmental Triangulation

This type of triangulation involves the use of different locations, settings and other key factors related to the environment in which the study took place, such as time of the day, day of the week or season of the year. The idea is to identify which environmental factor, if any, may influence the information you received during the study. The environmental factor is changed to see if the findings are the same. If the findings remain the same under varying environmental conditions, then validity has been established. This type of triangulation is only used when it is likely that the findings in a study may be influenced by some environmental factors.

Variants of the Triangulation Design

There are four variants in triangulation design; the convergence model, the data transformation model, the validating quantitative data model, and the multilevel model. The first two models differ in terms of how the researcher attempts to merge the two data types (either during interpretation or during analysis), the third model is used to enhance findings from a survey, and the fourth is used to investigate different levels of analysis. The convergence model represents the traditional model of a mixed methods triangulation design (Creswell, 1999). In this model, the researcher collects and analyzes quantitative and qualitative data separately on the same phenomenon and then the different results are converged (by comparing and contrasting the different results) during the interpretation. Researchers use this model when they want to compare results or to validate, confirm, or corroborate quantitative results with qualitative findings. The purpose of this model is to end up with valid and well-substantiated conclusions about a single phenomenon.

Researchers may choose to use the data transformation model (Creswell et al., 2004). This model also involves the separate collection and analysis of quantitative and qualitative data sets. However, after the initial analysis, the researcher uses procedures to transform one data type into the other data type. This is accomplished by either

quantifying qualitative findings or qualifying quantitative results (Tashakkori & Teddlie, 1998). This transformation allows the data to be mixed during the analysis stage and facilitates the comparison, interrelation, and further analysis of the two data sets.

Researchers use the validating quantitative data model when they want to validate and expand on the quantitative findings from a survey by including a few open-ended qualitative questions. In this model, the researcher collects both types of data within one survey instrument.

The fourth variant of the Triangulation Design is what Tashakkori and Teddlie (1998) referred to as “multilevel research” (p. 48). In a multilevel model, different methods (quantitative and qualitative) are used to address different levels within a system. The findings from each level are merged together into one overall interpretation. For example, Elliott and Williams (2002) studied an employee counseling service using qualitative data at the client level, qualitative data at the counselor level, qualitative data with the directors, and quantitative data for the organizational level.

(a) Triangulation Design

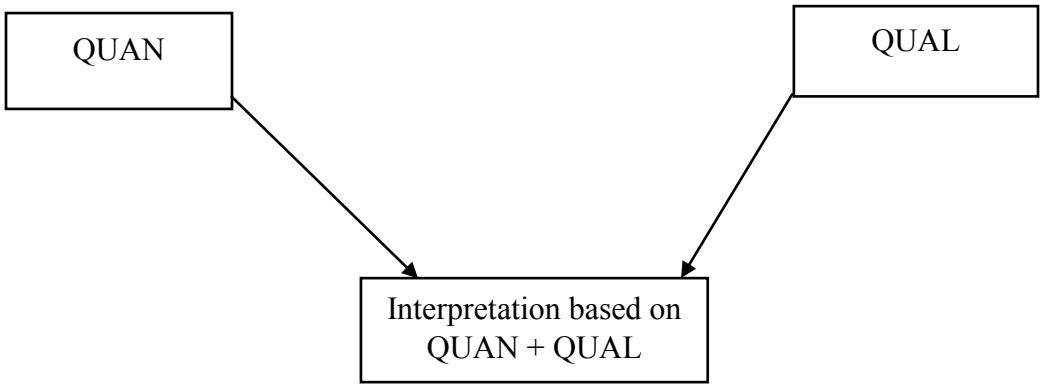

Figure 1: ***The triangulation Design*** Source: Creswell and Clark (2007)

(b) Convergence Model

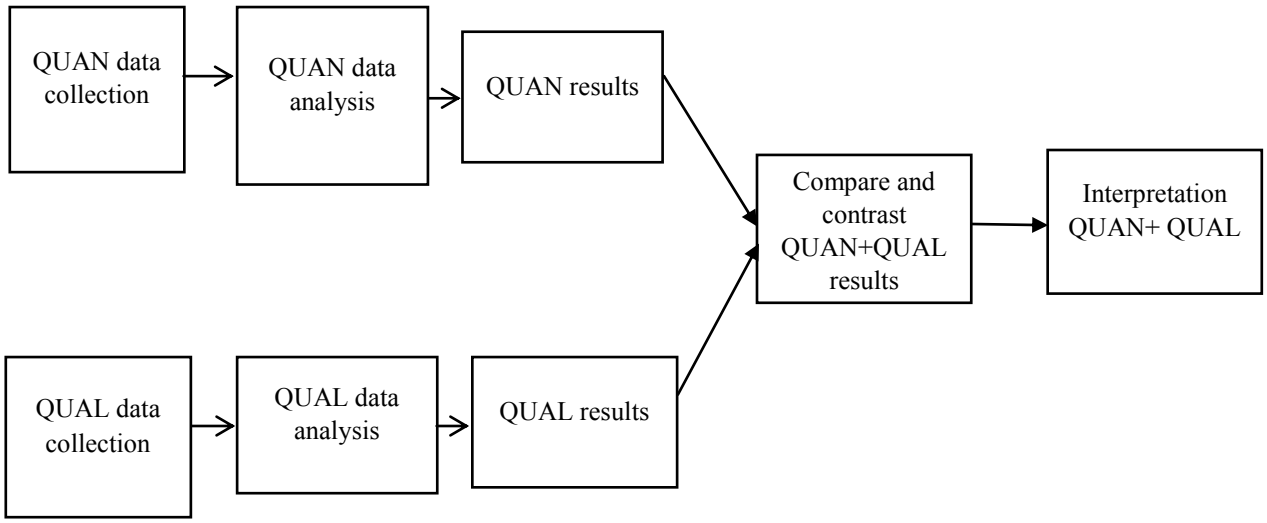

Figure 2: ***The Convergence Model*** Source: Creswell and Clark (2007)

Data Transformation Model (Transforming QUAL data into QUAL)

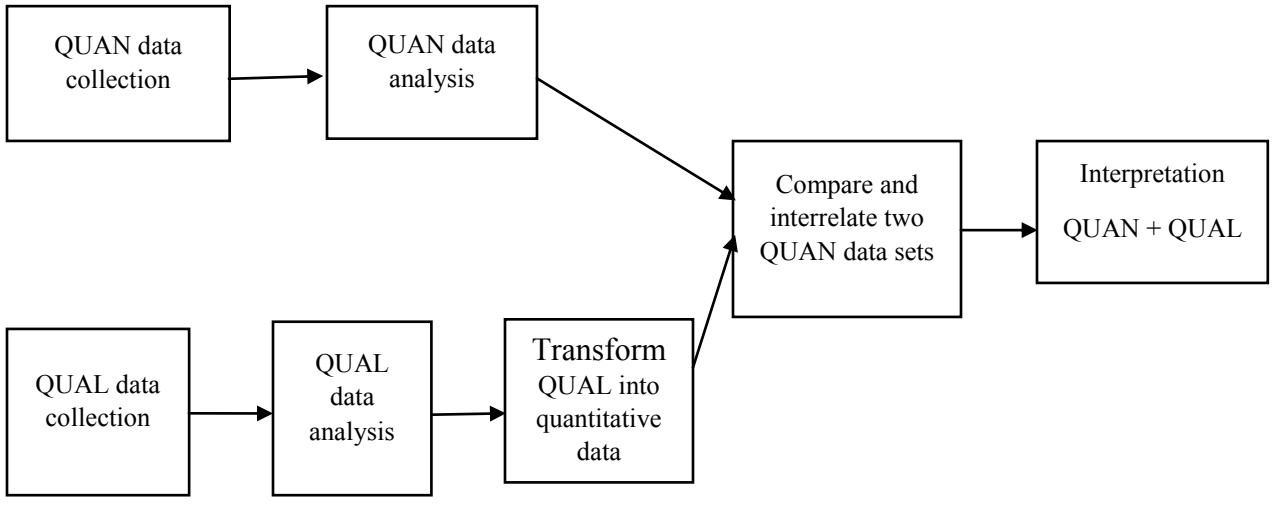

Figure 3: ***The Data Transformation Model*** Source: Creswell and Clark (2007)

(d) Validating Quantitative Data Model

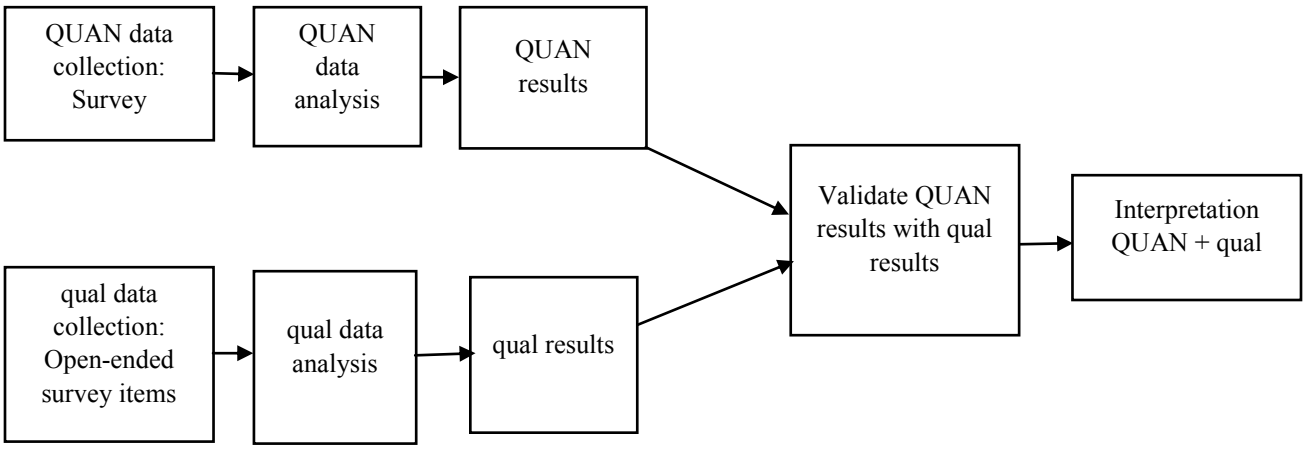

Figure 4: ***Validating Quantitative Data Model*** Source: Creswell and Clark (2007)

(e)Multilevel Model

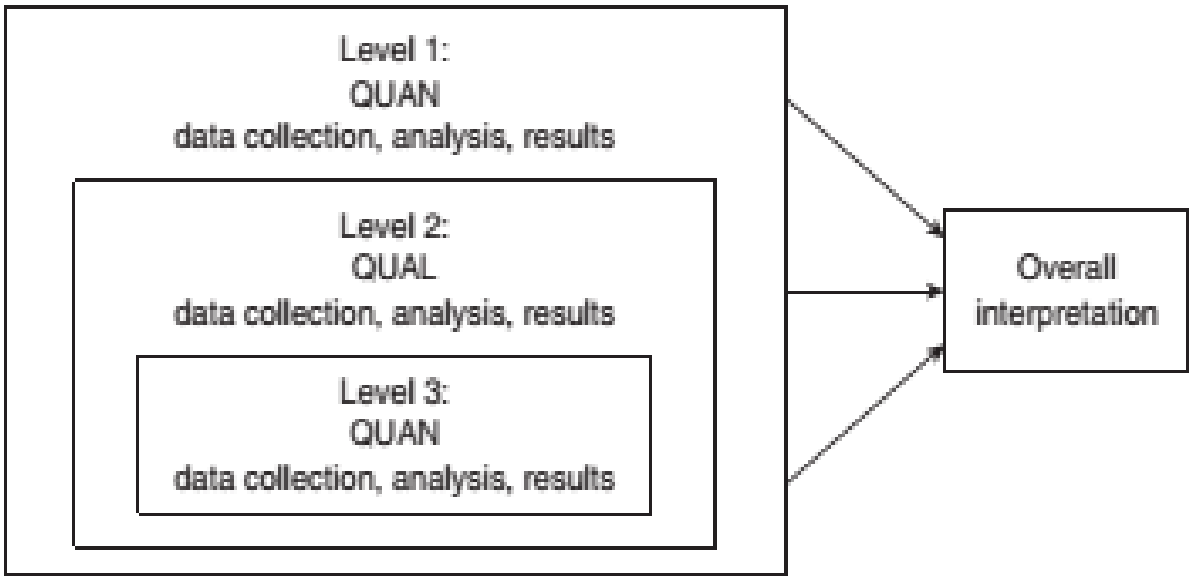

Figure 5: ***Multilevel Model*** Source: Creswell and Clark (2007)

A Critique of Creswell's Triangulation Design

Creswell has gone numerous miles in establishing the qualitative study designs. Moreover he has provided the sub-designs and their variants. However there are

noticeable weaknesses that we were able to identify .We don't wish to punch holes into this wonderful work as such but we wish that our readers can take these identified weaknesses as gaps that they can fill with more research.

For instance, the Convergence Model shows that the data collected concurrently is analyzed separately and then the results are compared and contrasted. This may be so but how can results of two different data sets be subjected to this comparison before one data is transformed into the other?

Secondly, the Data Transformation Model indicates that **QUAL** data is transformed into **quan** data before the results of both data sets are compared. Note the use of small letters 'quan' indicating that the transformed data is minor or secondary to the qualitative data. Our concern here is why the transformed data is not primary and why, for that reason, it is not indicated as **QUAN**? Creswell says that when using the same model, either quantitative or qualitative data is transformed, why then don't we have two diagrams under this model ; one showing that qualitative data will be transformed into quantitative data and the other showing quantitative data will be transformed to qualitative data?

Thirdly, the Multilevel Model indicates that **QUAN** data and **QUAL** data collected at different levels is analyzed then the overall results interpreted. Here too we ask how these two different data sets can be interpreted before one data is transformed into the other and later the results are compared then interpreted?

Fourthly, Creswell has showed that in addition to data and methodology triangulation, we have investigator and theory triangulation. Why then don't we have investigator and theory triangulation presented diagrammatically? If these two are in any way considered in the presented diagrams, how then can we tell a particular one shows data, methodology, investigator or theory triangulation?

Moreover, the use of different investigators to carry out the same study may look credible but when the results by the different investigators differ it will result into a further study to uncover the truth. What a waste of time and resources this shall then be? On theory triangulation, hiring professionals from different disciplines may be costly

in terms of time and payment and there is a possibility of having different result findings. Needless to say, methodological triangulation requires more resources and time in collecting, analyzing and interpreting data from the different methods.

Finally, when we talk of data of equal weight, what do we mean? How do we weigh or measure qualitative data to claim that it is of equal weight with quantitative data? We all know that qualitative data can't be expressed in numbers or numerically, how then can we be right to claim that the codes, categories and themes created in the analysis of the qualitative data could be equal to the numbers used in the quantitative data?

Conclusion

We, the authors of this paper, feel that a lot of good work has been done but future researchers can fill the gaps identified to make everything clear. It is important though to note that Creswell has done commendable work which is undoubtedly useful to researchers wishing to use the Mixed Methods Paradigm and more so the triangulation designs.

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