

Application of triangulation in qualitative research

Abstract

Quantitative and mixed-methods studies are more popular among Ghanaian researchers than qualitative studies. The preference for quantitative and mixed-methods studies originates from the notion that these are more scientific and rigorous, and produce generalizable findings and conclusions. Though qualitative studies appear difficult and laborious to design and conduct, and generally, the findings produced from qualitative studies seem not to be rigorous, qualitative studies can also produce robust findings and conclusions. Researchers who want to conduct qualitative studies must have good knowledge of the ontology, epistemology, and methodology of qualitative research. A vital skill qualitative researchers must possess to conduct quality research is the application of triangulation in qualitative research. The effect of the weaknesses of qualitative research on findings and conclusions can be minimized through the application of triangulation. The purpose of this article is to highlight the application of triangulation in qualitative research. It begins by explaining triangulation and its origin and then discusses the four main types of triangulation and how they can be applied in qualitative research.

Keywords: Ghanaian, research, types of triangulation, methodological, data, researcher, theory, triangulation

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Introduction

The use of qualitative method in studies conducted by Ghanaian researchers and scholars is gradually becoming popular.¹⁻⁵ In the recent past, those who attempted to use qualitative method used it in conjunction with quantitative method. The approach is called the mixed methods approach. The mixed methods approach employs the best attributes of qualitative and quantitative methods and therefore leads to conducting valid and reliable studies. In countries like United States of America and United Kingdom, qualitative methods are widely accepted and have become the dominant research method used by researchers.⁶ However, in Ghana, the dominant research method used in social science research is the quantitative research method. The continuous use of the mixed methods approach has made some Ghanaian researchers realize that pure qualitative studies can produce sound findings just as quantitative studies. The authors of this article hold the view that qualitative studies have not become very popular among Ghanaian researchers because they have not fully accepted the ontology and epistemology, unlike the methodology of qualitative research. If placed on a continuum, the ontology, epistemology, and methodology of qualitative and quantitative research would be at opposite ends.

For the purpose of this article, we shall focus only on the ontology and epistemology of qualitative study. The ontology of qualitative research is based on idealism.⁷ According to Maxwell and Mittapalli,⁸ idealism subscribes to reality as an intangible mental construction. Mental constructions are dependent on attributes such as knowledge, experiences and context under which the construction was made and therefore truth or reality cannot be singular. Idealism is based on the principle that, there are multiple realities which are constructed based on social processes, historical events and language. The epistemology of qualitative study is interpretivism. The primary idea of interpretivism is that knowledge is grounded in the individual's particular experience, subjective and bound to natural situations. Knowledge is therefore not generalizable. This is because knowledge is subject to values and other personal attributes which may not be applicable to participants in other places or situations. Greene⁹ explained that interpretivism is about the reconstruction of inter-subjective meanings and the interpretation of meaning people construct in a situation and how the constructed meaning relates to

the whole. In view of this, the construction of knowledge as stated by Greene⁹ is "idiographic, time-bound, place-bound, multiple constructions are pluralistic, divergent and even conflictual" (p. 68). Knowledge is constructed from two sources; from the meaning the participants give to their experiences, including the cultural and experiential worlds from which the beliefs and perspective are formed and, second, the beliefs and experiences of the researcher. Knowledge is therefore co-created through the interaction of the researcher with the participants.

It is the subjective nature of the findings and other limitations of qualitative methods that make researchers avoid the use of qualitative methods. As mentioned by Rahman,¹⁰ qualitative research methods sometimes ignore contextual sensitivities and rather focus on meanings and experiences. This is typical of the phenomenological approach. Phenological studies mostly focus on attempting to uncover, understand and interpret the participants' experience rather than other imperative contextual issues.

It is not surprising that Sallee and Flood¹¹ are of the view that policy-makers give low credibility to the result of qualitative studies, simply because qualitative studies often neglect the social and cultural constructions of the variables being studied.¹⁰ Another limitation of qualitative research is the generalizability of the findings. This limitation originates from the relatively small sample size and the sampling procedure employed in qualitative studies. Qualitative research requires the researcher to immerse himself/herself in a group to make observations. In view of this, so many participants cannot be studied at the same time. Non-probabilistic sampling techniques are employed in selecting participants for qualitative research. Purposive and convenient sampling techniques are often used. Samples obtained with these techniques are not representative of the population, hence findings cannot, to a large extent, be generalized to the population.¹² Data interpretation and analysis are difficult and complex. The analyses of the various cases also take a considerable time to complete. These limitations should not deter researchers from conducting qualitative research. The limitations can be minimized by employing triangulation.

The benefits of using triangulation are enormous. Triangulation is often used by methodologists to validate and confirm qualitative

results with the results of quantitative studies. It is also used to validate instruments when the research phenomenon being investigated has little theoretical underpinning. Another benefit is its application in confirming if an instrument was appropriate for studying a phenomenon. Triangulation helps researchers to overcome biases associated with the use of single-observer, single-method, and single-theory.¹³ Overcoming these biases result in confirming results and conclusions. With respect to completeness, triangulation is used to increase the depth of the investigation by combining multiple investigators, methods, and theories. This approach allows for the recognition of multiple realities.¹⁴ It helps researchers to investigate unexplored or less explored research problems. Besides helping in the study of unexplored or less explored research problems, triangulation is important in the study of complex research phenomena by employing different qualitative approaches to generate rich data and gain a deeper understanding of the phenomenon under study. This paper discusses the origin and types of triangulation and their application in qualitative research.

Triangulation- a brief explanation

The term triangulation which is derived from the triangle analogy, according to Decrop,¹⁵ implies considering a single point from multiple independent sources. Triangulation was borrowed from the mathematics concept of trigonometry. In mathematics, triangulation is a technique used to determine the location of points using the laws of trigonometry. Triangulation is commonly used in navigation³ and land surveying techniques used to identify a point in space using measurements taken from two separate places. The term has been successfully adapted by social science researchers. Turner and Turner¹⁶ defined triangulation in social science research as the process of studying a social phenomenon by combining data from divergent sources. A much earlier definition by Greene and McClintock¹⁷ defined triangulation as the use of multiple theories, data, methods, and observers in research to study one phenomenon. Heale and Forbes¹⁸ considered triangulation in relation to research methods and design. They defined triangulation as the employment of different approaches to answer research questions or test hypotheses. Their definition is however similar to the definition given by Greene and McClintock.¹⁷ To Heale and Forbes¹⁸ “triangulation may be the use of multiple theories, data sources, methods or investigators within the study of a single phenomenon” (p.98).

Triangulation is very often associated with studies that combine quantitative and qualitative data collection procedures and data analysis techniques in the study of a phenomenon.^{19,20} In brief, triangulation is about studying one phenomenon from multiple sources of data, using different theories, methods and researchers. In triangulation, information gathered from a variety of sources is used to corroborate, elaborate and also illuminate a research problem, thereby minimizing methodological and personal biases and enhancing the generalizability of a study.

The origin of triangulation in research

The application of triangulation in research dates back to the classic methodological triangulation era. This is the period from 1939 to 1961. During this era, triangulation was used in some studies, like, the robber’s cave experiment, the end-of-the-world cult study, and the Hawthorne studies. The Hawthorne studies were studies on the effect of social and psychological aspects of human behavior in an organization. The studies specifically investigated how individuals improve or modify their behavior when they are aware they are being observed as they perform their activities. As stated by Mile,

Huberman and Saldan²¹ it was a five-staged study that followed the following order; the relay assembly test, room study, the second relay assembly group study, the mica splitting room study, the interviewing program, and finally the bank wiring observation room study. While the first three stages studied the effect of physical conditions of work on human behavior, the final stage studied informal group organization in the workplace. In that study, both qualitative and quantitative data collection and analysis procedures were employed. The Hawthorne studies is credited as the first study to use methodological triangulation (mixed methods) to study a research problem.

The “End-of-the-World-cult” study was conducted by Feetinger and Katz in 1953.¹⁹ The “End-of-the-World-cult” was a human psychological study that was conducted based on a theory that said, cult members’ dedication to cult activities increases with disconfirmation of cult belief. The researchers pretended they were cult converts and used participant observation to carry out the research. The researchers used the extent of a prior commitment and social support to assign cult members into two groups. The most significant approach Feetinger and Katz used was analyzing data collected from the observation quantitatively.¹⁹ The quasi-experimental design, therefore, employed both qualitative and quantitative research techniques. In the Robber’s case experiment, Sherif et al.,²² investigated intergroup conflict and cooperation. The 22 boys who participated in the study were put into two groups such that there was a balance of social, mental and physical talents. In the first phase of the experiment, the two groups were assigned tasks that foster bonds between children. In the second phase, the two groups engaged in a winner takes all competitive activity. Following the observation that competitive activities increased hostility between the two groups, the researchers introduced the third phase to help the two groups reconcile. In the fourth and final stage, the groups were given activities neither group could perform alone. The experiment was a quantitative study, however, participant observation which is a qualitative data collection technique was used to collect the data. Though studies employed triangulation before 1959, it was Campbell and Fiske²³ who introduced the concept of triangulation. They introduced triangulation as a synonym for convergent validation. Following the introduction of the concept, researchers like Flick¹² refined it to mean mixing quantitative and qualitative methods. In its current form, triangulation goes beyond mixed methods. There are four main types of triangulation.

Types of triangulation

Methodological triangulation

Methodological Triangulation is commonly called mixed-methods. It involves the use of qualitative and quantitative research approaches to investigate a phenomenon. Qualitative and quantitative research approaches differ significantly in their ontology and epistemology; however, they are similar in terms of their scope and nature of the inquiry. To Thurmond,²⁴ qualitative and quantitative research approaches both seek to understand and offer explanations for behavior and events hence the best elements of qualitative and quantitative research approaches can be mixed in a single study. For example, probabilistic sampling which is the sampling technique used in quantitative studies can be used to select the sample for a qualitative study to make findings generalizable.

The most common way of triangulating with method is the use of both qualitative and quantitative data collection instruments and procedures and data analysis in a single study. Studies that employ this technique use quantitative data collection instruments like test and questionnaire in conjunction with qualitative data collection

instruments like interview guide or focus group interview guide. Another way of triangulating with method is to use in-method triangulation. As the name suggests, multiple approaches within the same research approach (qualitative or quantitative) are employed in a study. For example, in one study, the researcher may use documentary analysis, observation, and focus group interviews to collect data. This may appear to be data triangulation but it is not. The in-method triangulation focuses on the data collection procedure not the source or type of data. One advantage of using multiple instruments to collect data from participants on a particular phenomenon is the richness of the information obtained. In-depth information is collected to reveal information that may otherwise remain hidden or expose the unique difference in the phenomenon. That is to say, methodological triangulation leads to an in-depth study of a phenomenon. Similarly, the analysis is done using both quantitative and qualitative data analysis approaches, hence, robust findings and conclusions are generated from the analysis. Methodological triangulation improves the validity and reliability of the findings. It is worth pointing out that, using methodological triangulation may lead to conflict about the research design due to the differences in epistemology and ontology of the two methods. Also, combining quantitative data and qualitative narratives to produce findings on a phenomenon is difficult.

Data triangulation

Data triangulation is the use of multiple complementary data to investigate a phenomenon. Data triangulation is often confused with methodological triangulation.¹³ The confusion can be cleared by looking at data triangulation from people, time and space perspectives. Data triangulation can be achieved in several ways. The primary data of qualitative studies most often comes from observation and interviews. Different groups of people can be observed or interviewed to collect the same information at different times and places. For example, students from different schools and their parents can be interviewed on students' use of smartphones. The interview can be repeated six months later. The interviews can be repeated after a certain period. Documentary analysis may be done using a document of different types (textbooks, newspapers, promotional materials and letters), obtained from different sources (libraries, the wide world web and academic institutions). Another way of triangulating data is by writing field notes or reports during and just after an observation or interview session with participants. These notes or reports may provide additional information on the context in which the interview or observation was done. These may not directly be recorded in the transcript or observation checklist. In observation and interview, other vital information that may be missed are the non-verbal behavior such as participants' reaction, gestures, group behavior etc, are potential source of insight or clues. If fields notes or reports are written, non-verbal behavior may not be missed. The purpose of using data triangulation is not just to gather comprehensive data about the phenomenon being studied, it is a means of validating and verifying data as well as recognizing inconsistencies in the data sets.

Researcher triangulation

Researcher triangulation is the use of multiple researchers in a single study. In researcher triangulation, two or more researchers, interviewers, observers, or data analysts play different roles in the conduct of a study.²⁵ At the heart of researcher triangulation is teamwork and collaboration between researchers.¹⁵ Valencia²⁶ pointed out three conditions that must be satisfied when applying researcher triangulation. For a team to say they are employing researcher triangulation, each researcher should play a prominent role in the

study, the researchers should have different experiences and the disciplinary bias of researchers should be evident.

A researcher may be apt in making observations, another in the conduct of interviews, a third in analysis and another in report writing. These four researchers may team up to study a phenomenon by taking up different aspects of the study. There is a high probability that different researchers may be experienced in using different qualitative research approaches. In such a situation, both researcher and in-methods triangulation may be at play to provide a balanced broader perspective of the phenomenon being studied.²⁴ One of the downsides of researcher triangulation is the potential of jeopardizing a study. Where researchers adhere strictly to their epistemology or a particular qualitative research technique, researchers may not understand the viewpoints of one another and it will result in a clash of viewpoints. The key advantage of research triangulation originates from teamwork. Due to the involvement of different researchers, researcher triangulation helps in reducing biases that originate from gathering, reporting, and analyzing data, thereby improving the reliability and validity of the research.

Theoretical triangulation

To Thurmond,²⁴ theoretical triangulation is the use of multiple hypotheses and/or theories in examining a phenomenon. In other words, theoretical triangulation involves testing rival theories, alternative explanations or rival hypotheses relating to the same phenomenon. To employ theoretical triangulation, the hypotheses or perspectives used in the research should either be related or have opposing viewpoints. The prime motive for using theoretical triangulation is to examine a theory or test hypotheses, having in mind multiple lenses and questions that refute or lend support to findings. Theoretical triangulation may be used to test various theories through the analysis of information from the same data. The chances of having alternative explanations for a phenomenon may decrease if only one hypothesis or theoretical perspective is used. Theoretical triangulation increases the chance of getting alternative explanations through the provision of a broader and much deeper analysis of findings. Theoretical triangulation challenges researchers to think outside the box for explanations and prevent researchers from accepting plausible explanations prematurely. However, if the concepts in the theoretical framework are not clearly defined, theoretical triangulation can be confusing. Another challenge that may arise with the use of theoretical triangulation comes from the use of opposing theories. Concepts may be difficult to interpret if the theories are not well differentiated and overlaps in the competing theories are not clearly stated.^{27,28}

Conclusion

The qualitative method has been unpopular among Ghanaian researchers. The unpopularity of the qualitative method is due to the notion that quantitative studies are more rigorous and scientific and therefore produce sound findings and conclusions. The perceived superiority of quantitative research over qualitative research has come about as a result of quantitative researchers hyping the weaknesses of qualitative research. Just like the quantitative method, the qualitative method can produce robust findings and conclusions, if researchers take the time to understand the ontology and epistemology of qualitative research. One way of overcoming the weakness of the qualitative method is by applying triangulation. Triangulation in simple terms is the use of multiple theories, data, methods, and observers in research to study one phenomenon. The application of triangulation in qualitative studies for confirmatory and completeness purposes leads to the conduct of rigorous and in-depth qualitative

studies. The use of triangulation in research originated from three classical experiments that were conducted in the first half of the twentieth century. The application of triangulation was later refined in the 1960's to become a technique for conducting high-quality research. There are four main types of triangulation. Of the four main types, methodological triangulation is the most commonly used. There are two variants of methodological triangulation – in-method and mixed-methods triangulation. The mixed-methods triangulation involves the application of the best elements of qualitative and quantitative research approaches to study a phenomenon while the in-method approach uses multiple approaches within the same research approach (qualitative or quantitative) to study a phenomenon. Data triangulation is the use of multiple complementary data to investigate a phenomenon. Data triangulation should not be confused with methodological triangulation. In data triangulation, data relating to one phenomenon are obtained from different groups of participants, at different times and/or at different places. The participant, time and space perspective is what distinguishes data triangulation from methodological triangulation. The application of teamwork and collaboration leads to the application of researcher triangulation. In researcher triangulation, two or more researchers, interviewers, observers, or data analysts play different roles in the conduct of a study. The fourth type of triangulation is theory triangulation. Theoretical triangulation involves testing alternative explanations, rival theories, or rival hypotheses relating to the same phenomenon through research.

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Conflicts of interest

There are no conflicting interests declared by the authors.

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