Key Distinctions between Qualitative and Quantitative Research in Theory and Data: Epistemological and Ontological Considerations

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ABSTRACT

This paper examines the key distinctions between qualitative and quantitative research in terms of theory and data, from the point view of epistemology and ontology. The paper highlights the distinct concepts of qualitative and quantitative research. Analysis was based on secondary sources of data from the Library. The paper is divided into the following subsections: Background information, statement of the problem and project theories. The discussions of the study shed more light on epistemological distinction between qualitative and quantitative research, the ontological distinctions between qualitative and quantitative research.

Key words: Qualitative research, Quantitative research, Data, Theory, Epistemology, Ontology

INTRODUCTION

Background Information

According to Kothari (2004) Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. It is based on Positivist research paradigm which uses experimental designs to measure effects, especially through group changes. The data collection techniques focus on gathering hard data in the form of numbers to enable evidence to be presented in quantitative form (Kurgat, 2016). In terms of methodology, truth in positivist inquiry is achieved through the verification and replication of observable findings (Lincon, 1994)), variable manipulations of the research objects (Bryman.A, 1988) and the application of statistical analysis (Lincon,1994). Positivists therefore, emphasize the use of valid and reliable methods in order to describe and explain the events.

Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e. Phenomena relating to or involving quality or kind. For instance, when we are interested in investigating the reasons for human behavior (i.e., why people think or do certain things), we quite often talk of 'Motivation Research', an important type of qualitative research (Kothari, 2004). This type of research aims at discovering the underlying motives and desires using in depth interviews for the purpose. Other techniques of such research are word association tests, sentence completion tests, story completion tests and similar other projective techniques. Attitude or opinion research, that is, research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research (Mugenda, 1999).

Qualitative research is especially important in the behavioral sciences where the aim is to discover the underlying motives of human behavior (Atieno, 2009). Through such research we can analyze the various factors which motivate people to behave in a particular manner or which make people like or dislike a particular thing.

Qualitative methods are highly appropriate for questions where preemptive reduction of the data will prevent discovery (Young.C, 2015). If the purpose is to learn from the participants in a setting or a process the way they experience it, the meanings they put on it, and how they interpret what they experience, the researcher needs methods that will allow for discovery and do justice to their perceptions and the complexity of their interpretations. Qualitative methods have in common the goal of generating new ways of seeing existing data. If the purpose is to construct a theory or a theoretical framework that reflects reality rather than the researchers own perspective or prior research results, one may need methods that assist the discovery of theory in data(Young, 2015).If the purpose of research is to understand phenomena deeply and in detail, the researcher needs methods for discovery of central themes and analysis of core concerns. Perhaps the research question that one is tackling with in-depth interviews would be more properly addressed with a survey. In such a case, the best advice is that you review your general purpose and ask yourself if it can be addressed better that way (Ochieng, 2009).The purpose of this paper is to analyze the distinctions that exist between qualitative and quantitative approach to research from the perspectives of theory and data, epistemology and ontology. Fundamental distinctions of the two approaches have been made against theory and data epistemology and ontology. The distinction act as premises for more generalized inferences (Conclusions) as indicated in the paper.

Statement of the problem

Qualitative and quantitative researches are key tools of investigation regarding various issues in the society at large and in projects (Mugenda, 1999).However according to Mugenda (1999) assumptions for qualitative and quantitative researches are very different and most researches have the difficulty of drawing the cutline between the two. Though, they have unique aims and purposes in research it is not clear for some researchers to clarify the purposes of the two. Subsequently lack of that clarity of purposes can interfere with the research findings. Thus, there is unlimited appeal to pay attention to qualitative and quantitative research differences in terms of reality, viewpoints, values, focus, orientation, data, tools, conditions, coding of data and data analysis. According to Mugenda (2013) in current ages qualitative research has become progressively actual in proving pertinent and hands-on solutions to research but most people are not at ease to use it. Systematic method (quantitative) has usually been careful conventional mode of inquiry but it is not sufficient without qualitative approach. Many researchers in Kenya are struggling to draw the distinction of the two approaches. Shockingly these projects researchers are experiencing failures in matters concerning educational, efficient, vigor, and administrative concerns. Inappropriately many project researchers have been conditioned to think that quantitative approach is similar to qualitative approach (Hamza, 2015). Therefore the aim of this study was to pinpoint the key distinctions between qualitative and quantitative research in terms of epistemology and ontology, with focus on theory and data.

Study Purpose

The purpose of this research is to examine the key distinctions between qualitative and quantitative research in terms of theory and data, from the point view of epistemology and ontology.

Objectives of the Study

1. To establish epistemology distinction between qualitative and quantitative research
2. To determine basic ontological distinction between qualitative and quantitative research.

LITERATURE REVIEW

Fundamental Distinctions

This section gives the fundamental differences between theory and data. Elaborate information is illustrated by examples of the theories used in projects.

Data and Theory

Data

Data is the information gathered by the researcher, and can be classified as Primary or Secondary. Primary data refers to first hand law information collected directly from the original source. Then secondary data which refers to processed or edited information normally found in journals, books, magazines and many others (Mugenda, 1999).

There exist two major types of data in research namely quantitative data and descriptive/ nominal data. Quantitative data takes two forms namely numerical data and categorical data (Oyugi, 2019). Categorical data is data whose value cannot be measured numerically but can either be classified into sets of categories according to their characteristics (Oyugi, 2019). Numerical data is data whose values are measured or counted numerically as quantities and they can be classified into interval data, ratio data or continuous data and discrete data. Descriptive data falls into two categories known as dichotomous data and ranked data. Dichotomous data is further divided into two categories such as male, female, tall, short. Ranked data are more precious whereby you know the relative position of each subset (Oyugi, 2019).

A theory is a set of assumptions which can be taken to be true or not, or open for discussions, speculative thought or an abstract knowledge while data is information gathered by a researcher for his or her study (Mugenda, O & Mugenda, A.1999) both qualitative and quantitative research aim at proving or disapproving theories. However qualitative research does so through analyzing the underlying logic in the theory mostly through deductive reasoning while quantitative research lays more emphasis on evaluation of a theory through quantification and inductive reasoning

Theories: Appeal to Project management Theories

Project management is a discipline which is very unique and effective in the exercise of managing projects. There are a number of theories that guide the practice of project management. Given below is a subset of selected project management theories for the purpose of this study.

Program Theory

This study is based on the program theory advanced by Such man in the 1960's.The program theory has been used to guide project evaluation for many years; it shows the capability of the program to fix a problem by addressing the needs in the need assessment. It also gives tools to determine areas of project impact in evaluation (Bryman. A, 1988). (Bryman. A, 1988)Argue that a program consist of an organizational plan on how to deploy resources and organize activities of the program to ensure that the intended target population receives the intended amount of intervention. The concept of a program theory is similar to the one used in logical models. The program theory hence uses logical framework approach as its methodology (Guba, 1987). The difference is that the program theory is a detailed version of the logic model. The program theory can also be represented graphically through the logical model. The logical model is used in guiding stakeholders? engagement, the management and evaluation of outcomes (Guba, 1987).

Change Theory

Theory of change is part of the program theory that emerged in the 1990s as an improvement to the project evaluation theory (Kurgat, 2016). Theory of change also known as the program theory/result chain/program logic model/ attribution logic (Kurgat, 2016); it is a causal logic that links research activities to the desired changes in the actors that a project targets to change. It is therefore a model of how a project is supposed to

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work. The function of a theory of change is to provide a road map of where the project is heading while monitoring and evaluation tests and refines that road map (Kurgat, 2016). Change theory is relevant to qualitative and quantitative approaches in that both are road map towards research for project success. A result approach answer the question to what extent has the original project target have been achieved just has does change theory.

A theory of change is a tool used for developing solutions to complex social problems in which adoption of qualitative and quantitative approaches is of great positive effect. It provides a comprehensive picture of early and intermediate term changes that are needed to reach a long term set goal (Kurgat, 2016). It therefore provides a model of how qualitative and quantitative research in a project should work towards success, which can be tested and refined through monitoring and evaluation. A theory of change is also a specific and measurable description of change that forms the basis for planning, implementation and evaluation. Most projects have a theory of change although they are usually assumed (Kurgat, 2016). The theory of changes helps in developing comprehensible frameworks for research monitoring and evaluation. Therefore, the study is based on the program theory advanced by Suchman in the 1960?s.

Theory of change represents belief about what is needed and by the target population and what strategies will enable them meet those needs (Haugh, 2012). This is similar to qualitative and quantitative research in projects since the quality services are key to beneficiaries. They establish a context for considering the connection between a system mission, strategies and actual outcomes while creating link between who is served, the strategies and activities that are being implemented and the desired outcomes. Based on theory of change any child based project has population, initiatives and outcomes. Outcomes may either be intended or unintended within the control of project team or outside his control, direct or indirect (Kurgat, 2016). In most projects the expected outcome of both qualitative and quantitative research are good performance. However, qualitative and quantitative factors contribute to that outcome even unexpectedly. Other outcomes a rise and affects the project team's social relationships, culture and family livelihoods. Hence innovative projects should consider the extent to which it impacts on clients and their society at large.

Both theories are linked to the study in that the program theory will help researchers of projects with tools to determine the impact of its performance, thus track success. The same theory will assist the project researchers to ensure that the target population are served as required. It also facilitates adherence to the project's logical framework. Similarly change theory provides a road map for the entire project in all its stages namely initiation, planning, execution, evaluation and closure.

Tuckman's Theory of Team Development

Tuckman's Theory of Team Development covers the importance of having the right research teams with the right qualitative and quantitative training on the particular roles that have been planned for hence leading to successful projects. It is on this basis that this study is grounded on this theory. Development of small researcher teams is of vital importance for the success of any project. Bruce Wayne Tuckman first espoused his theory of team development in a 1965 article "Developmental Sequence in Small Groups," and revised it in 1977. This model provides a good theoretical basis to build and develop project research teams, and to analyze the behavior of teams, (Bryman. A, 1988).

Tuckman explains the principle five stages of team development: team building as forming, storming, norming, performing, and adjourning. During the initial process involves project manager comes up with a research project team with the right skills and competence and the right level of education. However during the five stages incase training is needed then the project managers organizes for the same to sharpen the project team members' skills. The proponents of the Tuckman's Theory include (Kurgat, 2016), who

demonstrates how Tuckman's model for small group development can be used to examine the evolution of teams retrospectively for the purpose of improving future practice. In addition, (Kurgat, 2016)indicates that Tuckman's model remains relevant to the development of groups within call centers, particularly during the period of initial training of newly selected employees and subsequently, with minor modification through the inclusion of an additional temporary 'phase', to describe conditions imposed on groups by transience of group membership within the operational arena.

The development of research qualitative and quantitative teams follows the Tuckman's model of team development. During the forming stage, research team members in some project are uninformed about the team objectives and rarely interact with one another or assert themselves. During the second phase, storming, research project team members provide their opinions and views on the development of team objectives, team norms, roles and responsibilities, and other rules. The third stage, norming stage, involves resolving of differences among team members. During the performance stage involves achieving the laid down goals for the qualitative and quantitative researchers and the adjourning stage involves celebration of the achievement of goals of the projectand closure by examining their findings and success. This theory guides in the understanding of the fourth research question on to how project team influence success of child based projects in Kenya.

Theory of Constraints

The Theory of Constraints is an approach that is used to develop specific management techniques. It was first popularize by the novel, The Goal that applied the principles to operations management, (Hamza, 2015). Since 1997 it has found application in two areas within project management. This first is scheduling of a single project to reduce project duration and simplify project control. This is the main theme of the novel Critical chain. Only towards the end of this novel there is an indication of its use in project human resources. Project planning surfaces any constraints such as resources in terms of staff required, equipment and finances within which the project's objectives must be accomplished (Hamza, 2015).

In terms of data qualitative research seems to capitalize on subjective data, which are the perceptions and conceptions of people while quantitative research bases itself on objective data normally independent of people's perception (Mugenda 2013)

METHOD

This research uses critical and basis analytical methods. Analytical method plays the role of clarification of concepts and propositions by disentangling individual elements in a discourse, while critical method in this research to synthesize comparative analysis of ontological and epistemic differentiations in Qualitative and Quantitative research.

THE FINDINGS

Fundamental Epistemology

Epistemology is the branch of philosophy that is devoted to the study of knowledge and its related problems (Mattei, 1994). The concern of epistemology is in determining not just knowledge but true and certain knowledge (Episteme) as opposed to simple belief (doxa) from narrower point of view epistemology studies theories of knowledge. It not only helps us to understand what it means to truly know but also makesexplicit the process that leads to the acquisition of knowledge about specific phenomenon. According to epistemology there are four sources of knowledge namely authority, intuition, sense of perception (empirics) and reason (Ochieng, Odhiambo, 2009).

Basic Epistemological Distinction between Qualitative and Quantitative Research

Qualitative research is an approach of generating new knowledge based on intangiblerealities which cannot be grasped with an exclusive mentality. It calls for more rigor and has no rigid template upon which research is casted, and this is because it respects the role of everybody in the generation of knowledge. On its part quantitative research is inclined towards the empirical realities which tend to be more individuated. Assuch, quantitativeresearch would tend to localize itself to logical positivist epistemology which holds that truth is what can be ascertained, and what can be ascertained is what can be easily perceived or observed with the senses (Ochieng. Odhiambo 2009)

While qualitative research is based on epistemology understanding that reality's is either perceived or constructed and that "perceived reality" for a qualitative researcher means the acknowledgement that the knowledge of a phenomenon cannot be absolute; neither can it be objective in the full sense of the word, and that constructed reality implies that reality can be existent in several ways and that even the same reality can be experienced in different ways by different knower's (Hamza, 2015). The quantitative research appeals to objectivity. Reality in quantitative research is objective. It is also one. Therefore quantitative research will attempt to fragment reality so as to get independent and dependent variables both of which is measurable at least numerically. In this way we can conclude that it is easier to generalize in quantitative than in qualitative research (Atieno, 2009)

Thirdly as far as sampling is concerned qualitative research does not use probability sampling because its focus is in-depth investigation and not generalization. Qualitative researcher takes the task of looking for epistemological truth (real truth) as opposed to doxological truth (common opinion); as such she/he will be more interested more with the question of intensity than the question of extensity (Odhiambo, 2009). Quantitative research tend to be epistemological inverse to qualitative research in that it works well with probabilism and is concerned with doxological and expansive truth.

Fundamental Ontology

Ontology is the study of the concepts of reality; it is the search for knowledge about a phenomenon. It is defined as an approach or process that human beings apply to understand the universe or certain things (answers to the questions of what exists in the universe) it provides a definite and exhaustive classification which includes relationship that ties entities together to form a whole system. Ontology also deals with different views of reality. In philosophical sense, ontology is simply the study of being as it is (Jacquette, 2002)

Basic Ontological Distinction between Qualitative and Ontological Research

Qualitative research is more existentialist while quantitative research leans towards essentialism. Extentialism is a philosophical consideration that lays emphasis on the activities that influence and surrounds the individual phenomenon. E (Jacquette., 2002) essentialism emphasizes that the predetermined content of a phenomenon is what matters most. An essentialist will hold the view that essence nor the nature of a phenomenon is what defines a realty while an externalist will indicate that reality is neither static and nor predetermined.

Qualitative research therefore is based on conception that reality is dynamic, and being in dynamic, any method of research should not be quick to give a conclusion or a generalization, it should instead focus on explaining reality as it has variously appeared, quantitative research, being essentialist has the courage to make conclusions given that reality has always been fixed and manipulation on what part leads to a reaction on the other part of reality (Jacquette., 2002).

It is therefore important to note that qualitative research is more exploratory while quantitative research is more descriptive (Kothari 2004) this does not mean that qualitative research does not have descriptive elements and that quantitative research does not have exploratory elements. It only indicates matters of preferences.

GENERAL INFERENCES

Quantitative Research

It seeks causes and effects of human behaviors in terms of prediction and control and presupposes that stable realities are made up of facts that do not change (Mugenda, 1999). It further takes the outsider perceptive in its view point of reality as what quantifiable data indicates. Data obtained through quantitative research is objective and independent of people's perceptions. It is also empirical in nature, assumes social life can be measured using numbers.

This approach normally embraces controlled investigations which are conducted under controlled conditions. Its hypothesis are investigated and tested. A researcher starts with a theory and seeks to test it and the result are based on reliability and validity, the focus is on design and procedures to gain hard and replicable findings (Mugenda, 1999)

Quantitative research uses non-human instruments, reconstructed, tests, observation records, questionnaires, rating scales among many other tools. These tools are pre tested to enhance validity and reliability. Data is analyzed by use of statistical packages which yield discrete and inferential statistics. Reports results are presented in tables with explanations. A detailed description of a research problem, objectives, hypothesis, and methods are given. Quantitative research is based on the measurement of quantity or a mount. It is applicable to phenomena that can be expressed in terms of quantity (Kothari, 2004).

Qualitative Approach to Research

Qualitative research seeks to understand people's interpretations. The research has dynamic view point that reality changes with changes in people's perception. Therefore for qualitative research reality is what people perceive it to be (Hamza, 2015).

Data obtained is subjective since it is a perception of people in the environment. The data is in the form of text, materials or photograph and investigation are done under natural conditions. Discoveries, theories and hypothesis evolve from data collected (theory grounded) (Oyugi, 2019). Human being is the primary data collection instrument; the items are unstructured and can be modified, Depending on the situation data is analyzed by coding and organizing into themes, concepts then theories and generalization are tentatively and carefully formulated. The result is based on trustworthiness; the focus is on design and procedure to gain real and deep data. The report is rich in descriptions of behavior and the context in which its occurrences are given. Respondent voices are usually quoted and reports are normally narrative (Oyugi, 2019).

Qualitative research (some of the qualitative research) aims at discovering the underlying motives and desires, using in-depth interviews. Techniques of qualitative research are words association tests, sentence completion tests, story completion tests and similar other projective techniques. Research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research (Kothari, 2004).

CONCLUSION

This article clarifies fundamental differences between qualitative and quantitative methodologies from ontological and epistemological perspectives. Quantitative and qualitative research seems to differ at the level of logic. Logic in theory and data collection, logical foundations of their epistemologies and the logic that forms their ontology. Qualitative research can thus be considered deductive enterprise with commitment to certitude, quantitative research of its part is an inductive enterprise with commitment to probabilism.

RECOMMENDATIONS

Quantitative method emerges from positivism, which has realist alignment and is grounded on the idea of God's outlook or an autonomously prevailing reality that can be termed as it really is. The ontological stand of the quantitative paradigm suggests that objective reality exists independent of human insight (Sale et al., 2002). It also claims that the crucial truth subsists and there is only one truth.

Quantitative positivist epistemology also proposes that facts can be disconnected from values. Consequently, detectives can attain truth to the extent that their work corresponds to facts or how things really are. As a result, dualist view point in respect to truth as a matter of soundness and views validity as communication between the data and the independently prevailing authenticity the data reflect (Guba & Lincoln, 1994).

The purpose of qualitative scientific research is to acquire healthier consideration of the phenomena from the point of view of study partakers (Bryman, 1988). The stress is on rich description of the phenomenon through connotations, explanations, procedures, and circumstances (Guba & Lincoln, 1994).

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