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Qualitative and Quantitative Paradigms: Intimate Lovers or Distant Cousins?

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Abstract

The question on which paradigm to use for a research study has always presented problems, particularly to new researchers. The methodological waters are further muddied by many scholars who, among themselves, share different views on these paradigms. It thus becomes necessary to clarify the nature of arguments that are often thrown into the ring in debates on paradigms.

This paper looks at two major paradigms in social science research, qualitative and quantitative. The major aim of the paper is to explain, particularly to the beginning researcher, the nature of each paradigm. The reader is taken from the description of each paradigm through their different departure points up to whether the two can be reconciled or not. The paper demonstrates how choice of a paradigm influences subsequent methodology. At the end of the paper the issue of mixed research designs is raised. It is hoped that, armed with this knowledge, a beginner might be able to make informed choices when it comes to choosing a paradigm for his or her study.

Introduction

In my quarter of a century teaching at university, I have interacted with many students and faculty colleagues on social, academic and research matters. The motivation for this paper arises from my interactions with colleagues, in general, and in particular, students doing their research projects, dissertations and theses under my supervision.

What I have found to be most difficult for my students, and even for some fellow academics, is getting a proper handle on the two common paradigms, qualitative and quantitative research. What does each entail? When and how does one choose one instead of the other in a study? Can one use both in the same study?

The major objective of this paper is to shed light on the two common paradigms guided by the questions posed above. The approach, therefore, will be comparative. It is my hope that my discussion will be of use to both novice researchers and to some old timers who may still have some fuzzy ideas on the nature of the two paradigms but may not have the courage to admit so in public. However, my paper does not claim to be the last voice on this issue of paradigms but, suffice to say, if it can help to keep the debate on the subject going, it will have achieved one of its major objectives.

What is a paradigm?

Another name for a research paradigm is approach, perspective, belief, theory or axiom. It is a way one views the world (Merriam, 2005; Lincoln & Guba, 2005). We all operate on paradigms, consciously or unconsciously. In research, the need for a paradigm arises when a researcher is faced with the question: What is truth or knowledge? The question, simple as it may appear to some, is very loaded. It is a departing point for qualitative and quantitative researchers. A paradigm defines how one carries out one's research. In the rest of this paper, truth and knowledge are used interchangeably.

The two major paradigms

There are two major views on what constitutes truth. Kuhn, an American physicist and historian of science, defines truth as accumulative growth of knowledge through what he calls theory building. To Kuhn, knowledge is explainable by a theory or theories. Theory, according to Kuhn, is what a researcher seeks to confirm or extend. He says there are very few cases where a researcher seeks to destroy an established theory (Hutcheon, 1995).

To Kuhn, truth is objective and independent of a knower. It hangs out there on a tree, waiting to be discovered. Taking this route, the researcher chooses the quantitative paradigm to search for the truth. I will define later what this quantitative route is. For now, we should ask ourselves whether Kuhn's conception of truth is all there is to truth. Does truth exist independent of the knower, the human mind? Is truth inside or outside our heads? To be precise, is there any knowledge without the knower? How do we know that we know? What constitutes

evidence? Whose voices are heard? Who controls the research agenda? If we say truth dwells in the knower, the knower then becomes the object of study. Once we adopt this route, truth becomes subjective for no two people see the world in the same way. This is the qualitative route.

Kuhn's view of what constitutes truth is only one way of looking at truth. Paradigms show differences in ontology, epistemology and models of human nature. Differences in ontology, epistemology and models of human nature incline researchers towards different methodologies. Epistemology asks questions on the nature of truth and how a researcher and participants are related. Ontological questions focus on the definition of reality. Methodological questions arise from how one ought to go about obtaining truth (Lincoln & Guba, 2005).

The problem of defining what truth is gives rise to a number of paradigms or approaches in research. Examples of paradigms are positivism, with quantitative research as its generic name; and phenomenology, which falls under qualitative research. Other paradigms are critical theory, hermeneutics and realism in art. Critical theory is interventionist; it takes a pro-Marxist stance to research. It seeks to empower the underprivileged through advocacy and activism. Hermeneutics is a science of language, such as found in discourse analysis. The theory seeks to find how a piece of text or discourse hangs together to convey meaning. Hermeneutics is usually applied in linguistics studies. Realism is mainly concerned with what constitutes realistic portrayal of life in art. All these paradigms are not value free and are by no means complete. As said earlier, this paper focuses on quantitative and qualitative research. A quick look at what each of the two chosen paradigms constitutes is followed by a discussion of the relationship between the two paradigms.

Quantitative research seeks what it believes to be objective truth, mainly through the use of statistics. Its main objective is to validate or test a hypothesis or hypotheses stated a priori. It is based on calculability, replicability, causality, predictability, objectivity, mathematical reliability and validity. It claims to be value free in its pursuit of absolute truth devoid of emotional and subjective

explanations. It is therefore etic. It also seeks to validate or test relationships in samples and populations. Its approach to research is macro, linear and deductive. Studies falling under quantitative research play a confirmatory role, to achieve what Kuhn calls cumulative growth of knowledge (Hutcheon, 1995).

Qualitative research, on the other hand, is a science of finding essential meaning in society and not outside it. Qualitative research is holistic, value laden and constructivist. The social world is interpreted according to meanings people give it. The paradigm believes truth is found in people. It is therefore emic in perspective. It is micro and circular in nature. In qualitative research, one learns by doing, by participating in the world under investigation and focusing on what the actors say and do. It is therefore inductive (Bogdan & Biklen, 2003). A more appropriate term for qualitative research is interpretive inquiry (Hessie-Biber & Leavy, 2006). This term is more inclusive as well as being an apt term for describing how truth is arrived at. But because qualitative research is a more familiar term, this is the term that will be used throughout this paper to avoid confusion. Under qualitative research are sub-domains such as ethnography, grounded theory and case study (Agar, 1986; Yin, 2003).

Paradigms make different assumptions about the social world, how scientific research is or ought to be conducted, the nature of truth, what constitutes legitimate research problems, the purpose of research, the nature of truth statements, the role of values in inquiry and criteria of proof (Nyawaranda, 2003; Hessie-Biber & Leavy, 2006). Choosing a paradigm, therefore, has great implications on how a researcher conducts his or her research.

Choosing a paradigm

Beginners in research often ask: How does one choose an appropriate approach for one's study?

I often inform my students that choosing what paradigm to use is determined by one's research question. For example, the qualitative paradigm is appropriate where the researcher is looking at non-observable human qualities, such as perceptions, attitudes and views.

Remember, truth in qualitative research is in the knower and is, therefore, subjective. This means, therefore, mathematicising, quantifying, '*formulatysing*' and, most importantly, '*inferentiatysing*' it, as the case is in quantitative research, is not appropriate for understanding the qualitative world and, specifically, human phenomena such as smiling, humour, music, art, suffering, love, faith, in all their dimensions. But where, for example, a researcher is looking at the effectiveness of a new drug, he or she may use the quantitative paradigm of the experimental design with its attendant statistical analysis. At the end of this paper, I will address whether the two paradigms, qualitative and quantitative, can be mixed in one study.

A researcher should know that different paradigms address different problems and seek different answers (Patton, 2002). Once chosen, a paradigm will have a bearing on the research problem, tools of data collection, procedures for data collection, analysis or interpretation of data and how the results are presented. The language or register a researcher uses is also determined by paradigm.

How does one's choice of a paradigm influence one's research?

To answer this question, let us examine the qualities of each of the two paradigms we are looking at, and from these qualities see how each calls for a special way of studying phenomena.

As already said, qualitative research focuses on meanings and understanding of phenomena. For example, a developer from the city may want to build a dam to benefit a community in a rural setting. He or she tells the intended beneficiaries how the dam will provide them with water as well as fish. He or she tells them that when full, the dam will claim the community's graveyard; and so their graveyard has to be relocated. But the intended beneficiaries will not hear of this. To the community, their graveyard is more important than the dam. The benefactor is puzzled and cannot understand such reasoning.

Obviously, to solve this impasse, one needs to sit down with the intended beneficiaries of the dam to understand how they view their dead. From listening to the affected community, one gets to understand

their world view concerning the dead. The developer in the process might get to know the way out of this standoff. For example, he or she might come to know how the dead might be appeased first before they are dug up to be reburied elsewhere away from the dam area. Without a proper understanding of the people's customs and traditions, sometimes well intentioned projects might forestall simply because of a clash of world views. And this is where qualitative research is useful and effective.

To understand a people's world view, for example, one has to understand their truth values. There is nothing like an illogical truth, superstition or unscientific reasoning. Remember, truth is subjective and context-bound. It is subjective because truth is in people's heads, and not outside. Because of that, the researcher has to get it from the people he or she is researching and this calls for listening to the voice of the people, and not to impose one's voice on them.

Because truth is in people and people live their truth in their everyday lives in natural settings, this means that qualitative research ought to be carried out in natural settings (Yin, 2003; Shumba & Nyawaranda, 2005). There should be no manipulation of the setting, as is the case with quantitative research. And human beings, being so unpredictable, one's research design should be flexible to accommodate this. In qualitative research, one plays it by the ear. The design is emergent (Yin, 2003).There is no hypothesis or hypotheses stated a priori but posteriori. The qualitative researcher goes into the field with some hunches, or a few guiding research questions; everything else has to emerge from interaction with the participants. This is truer of the ethnographic study which falls under qualitative research (Hammersley & Atkinson, 1993; Wolcott, 1995).

In qualitative research, the researcher is the chief instrument. The whole study should be interpreted by this chief instrument. This makes it easier for others to reinterpret the researcher's interpretation of a phenomenon, having been given the full context in which the researcher has come up with his or her interpretation. This reduces distortions, because no two people see the world in the same way. This is why there is bias or subjectivity in qualitative research. However, subjectivity in

qualitative research is a given. Later, in this paper, I shall explain how subjectivity is dealt with in qualitative research.

The view that truth in qualitative research is subjective and is found in people means that appropriate data generation tools and procedures for data collection have to be used to accommodate this view. Appropriate tools for data generation in qualitative research are open-ended interviews, focus group discussions, life stories, documents, artefacts and recorded observations. The focus is on the participant to give his or her own truth. This is referred to as the emic perspective (Bogdan & Biklen, 2003). I have deliberately left out the questionnaire. This data collection tool gives an etic view, and is therefore appropriate in quantitative research, such as in a survey.

For a researcher to be accepted by a community being researched, and to arrive at authentic data, he or she, particularly in an ethnographic study, has to stay in the field for a long time interacting with the participants, triangulating the various data from different tools of data generation (Denzin & Lincoln, 2011; Ulin et al., 2002).

It is more appropriate to talk of data interpretation rather than analysis in qualitative research, because the focus here is on meaning making. Data interpretation in qualitative research is on-going and recursive. In interpreting data, the researcher looks for recurring themes in his or her data. Hypotheses are formulated posteriori during data interpretation in the form of propositions. This is called inductive analysis. The process is different from quantitative research where hypotheses are stated a priori and the analysis is deductive.

Results in a qualitative research are presented in thick descriptions with use of descriptive statistics, such as percentages, graphs, to summarise them. Thick descriptions, also called the audit trail, provide detailed contexts for the reader of the research report to be able to make his or her own interpretation (Bogdan & Biklen, 2003; Flinders & Mills, 1993). Evidence, in the form of quotations to support claims made, is drawn from data gathered.
As far as possible, results of a qualitative research are reported in the participant's language, literally and metaphorically (Shumba &

Nyawaranda, 2005). This is so because truth is in the researched, and therefore it is appropriate that this truth be explained in the language of the knower. Indeed, it is a common ethical practice that in qualitative research the researcher takes his or her findings back to the participants to comment on whether the researcher has captured the participant's meaning (Shumba & Nyawaranda, 2005). In the event that the participant disagrees with the researcher, the researcher has to record this together with his own interpretation, for the reader of his report to be able to come up with his or her own interpretation.

Quantitative research, like qualitative research, is also a product of its basic assumptions on what constitutes truth. Because truth is out there in quantitative research, one has to start off with a hypothesis which is stated a priori. The researcher's task is then to accept or reject this hypothesis; and there are special procedures he or she follows to achieve this. Details of these procedures are beyond the scope of this paper.

According to a quantitative paradigm, truth is independent of the knower and is constant. The design of the study is therefore fixed and the setting is manipulated to accommodate this. For example, instead of studying a community in its natural setting, as in qualitative research, participants might be asked to fill in a questionnaire or to take a test in a hall or classroom, which is an unnatural setting. Some experimental designs of quantitative research might require laboratory work, which, again, is an unnatural setting. A common design of a quantitative research is a survey involving a questionnaire for participants to fill in. Sometimes these questionnaires are sent blindly to participants in different parts of the country or world. This is more so in today's world of advanced information technology.

In order for quantitative research to generalize its results, a representative sample, usually 10% of the population to be studied, is randomly selected for the study. For an experimental design, the selected sample is divided into two equal groups. One group is the experimental group and the other one is the control. Pre-testing is done to the two groups to see that they are the same on a variable or variables to be measured. After treatment of the experimental group, with the

control receiving a placebo, the two groups are then tested again and their means are compared. Using statistics to measure the significance of the difference between the means of the two groups, the hypothesis stated at the beginning is either accepted or rejected.

From the way the two paradigms, qualitative and quantitative, work, it is clear that the two are different in procedure and not necessarily in content. The content may be the same, but how this content is conceptualized and executed is different in the two paradigms. Following on to this, a common question that is often asked is: Can the two be combined or mixed in one study?

Can the two mix?

Conflict between quantitative and qualitative paradigms has led to the creation of the triangulation of paradigms. This makes it possible to apply both qualitative and quantitative research in one study. For example, Fielding and Schreier (2001) view this triangulation as complementary and interrelated. The argument for a mixed design is that multiple viewpoints allow for greater accuracy by providing a wide and more informing picture of social reality (Denzin, 1978). It is said that combining the two maximizes the strengths of each approach and minimizes the weaknesses of both.

Triangulation of two paradigms can be done at different levels. The first one involves multiple data sources; and the second involves multiple researchers from different paradigms doing the same study simultaneously. The third level involves use of multiple methods; and the fourth uses multiple methodological and theoretical orientations. In all these combinations, qualitative and quantitative researchers are advised to borrow methodological approaches from each other. For example, qualitative researchers are advised to adopt some methodological aspects from quantitative research, such as systematizing observations, using sampling techniques and developing quantifiable schemes for coding data. On the other hand, quantitative researchers are advised to exploit the potentialities of social observation. The variety and extent of these combinations are such that both paradigms are conceived as two ends of a continuum rather than as

two distinct approaches. In this way, the two are said to be complementary.

On the two being complementary, Creswell (2003) says the qualitative part could answer the 'what' question, and the quantitative one the 'how' question. For example, one could start off in a qualitative mode to generate hypotheses which are then subjected to testing using quantitative methods. This view can be summarized diagrammatically by a funnel that is wider at one end, the qualitative end, and narrow at the other, the quantitative end. See figure 1 below.

Figure 1. Qualitative vs. Quantitative Research Focus.

The products of the triangulation of the two paradigms are viewed differently by various scholars. For example, some qualitative researchers see the kind of relationship in a mixed design as similar to that of a horse and a rider, the horse being qualitative research and the rider quantitative. Subjecting qualitative research to further scrutiny by quantitative methods implies that qualitative research is not complete in itself; it has to be complemented by quantitative methods. This kind of relationship is untenable to some qualitative researchers of the purist mode. Another related problem arises in the event that the two paradigms yield different results. Which result is going to prevail?

In spite of the attempts to bring the two paradigms together, debates surrounding the superiority of one paradigm over the other still rage on.

Fielding and Schreier (2001) say that this traditional dichotomy has for a long time regarded the two approaches as distinct and incompatible with an ever widening gap between them. Mixed designs can work only if the power relation between the two approaches is managed well and if the nature of social issues under investigation is applicable to both approaches. The problem comes if, for example, quantitative researchers do not accept the values and theoretical underpinnings of the other approach by prescribing their own ways of doing research. For example, prescribing sampling techniques of quantitative research and quantifying schemes for coding data do not agree with the norms and values of qualitative research. In this regard, the two paradigms cannot be mixed, because they are like water and oil. This is because the two paradigms are founded on different assumptions about what constitutes truth. The argument here is that if questions of natural science are rightly treated according to the methods and style of natural science, then questions of the human psyche and society must also be treated according to the methods corresponding to their object in their own style.

Mudslinging matches

The two paradigms, quantitative and qualitative, are in a state of competition, opposition and incompatibility. In this paradigm war, quantitative researchers tend to find faults in quantitative researchers more than the other way round. This has a history. The quantitative tradition has enjoyed ideological hegemony for many years because of its emphasis on observable and absolute statistical facts and as a result its researchers feel superior. Consequently, qualitative research is viewed as the 'other' method; even to the point of calling it pseudo-scientific. In this regard, qualitative researchers appear to take a defensive role. Indeed, in all my research interactions with my students over the years, I have had a hard time convincing them that qualitative research is a legitimate alternative way of doing research.

The qualitative purist view is often criticized by quantitative researchers for lack of rigour in the way research is conducted. Most criticism is centred on generalisability, validity and reliability. A quantitative researcher might ask: How can a researcher generalize from a small non-random sample? Another question he or she might ask

is on reliability. If two researchers did the same study in qualitative research, would they get the same results? There is yet another question on validity often asked of qualitative research. This is the bias from the researcher's participant role (Bogdan & Biklen, 2003). Qualitative research is also criticized for being bulky and messy.

Indeed these are legitimate questions on the rigour of qualitative research. However, good as the questions may be, they reflect philosophical assumptions underlying a quantitative world view, and are therefore inappropriate questions for qualitative research. Different questions need to be asked about studies that operate from different perspectives. As we have already seen, qualitative and quantitative researches are based on different assumptions with respect to truth. This, therefore, means that there are different conceptualisations of generalisability, validity and reliability in the two paradigms (Patton, 2002; Uliu, et al., 2002; Lincoln & Guba, 2005).

In qualitative research, as already stated, the main objective is to gain insights and not to generate universal rules. The approach is process rather than product oriented. Qualitative research seeks to understand human behaviour from the actor's own frame of reference. This emic view means that the research process becomes a joint production between the researcher and the participants resulting in no epistemological break between the two (Hammersley & Atkinson, 1993). This, together with the audit trail that the researcher keeps, and triangulation of data, bring a different kind of validity to a qualitative study.

In quantitative research, validity comes from consistency of results when a study is replicated. In a qualitative study, where humans are involved, it is impossible to replicate a study. In a way, one cannot cross the same river twice! For example, in qualitative research, truth depends on context. Today a man might tell you he has three children. The next day he says five. And you ask why the contradiction? He replies: Did you want me to say five in the presence of my official wife? In qualitative research, the emphasis is on dependability from data that are internally coherent (Merriam, 2009). Objectivity or neutrality is

achieved through confirmability, i.e., interpreting and reporting the results from the participants' perspectives and in their own language, literally and metaphorically. It is a question of where voice should count as valid evidence. In any case, there is nothing like objectivity in any research. Not in a pure sense, of course. For example, the very act of selecting questions for a questionnaire is in itself a subjective act (LeCompte & Goetz, 1982; Johnson, 1994; Lincoln & Guba, 2005; Merriam, 2009).

Generalization in qualitative research is handled differently from that in quantitative research. Where humans are involved, it is possible to generalize in three ways. In general, all humans are the same. For example, they all crave for love. We can also say that humans are the same in some respects. For example, some eat pork and others do not. At a very narrow level, we can say: In no respect are humans the same. They all have different finger prints. These types of generalizations, arising from small, purposive samples, can give a lot of insights into human nature. For gaining insights, one does not need a big sample. One does not need to eat the whole ox to know that its meat is tough! Thus, in qualitative research, generalisability is substituted with transferability (Lincoln & Guba, 1997).

As for the bulkiness of qualitative research, yes it is; because it is detailed on nested contexts which allow for different interpretations by different readers of the research report. To qualitative research, there are multiple realities. As for being messy, qualitative researchers would say truth does not always come in neat packages.

Concluding remarks

The debate on qualitative and quantitative paradigms has always existed in research. I have personally witnessed quarrels, and even physical fights, over these two major approaches to research. A more detailed treatment of the verbal war on paradigms is provided by Magagula (1996).

The two paradigms discussed in this paper use logic to inform all reasoning in their research processes, whether it is hypothetico-

deductive or the inductive approach. Both paradigms are concerned with knowledge tracking and are data driven, but use different procedures. In this regard, both are scientific, valid and legitimate ways of finding out truth or knowledge. But, as this paper argues, this relationship does not extend to the two being intimate lovers; but, perhaps, distant cousins. Ultimately, when it comes to choosing what paradigm to use, it is a question of personal belief; what a researcher believes truth to be, and, therefore, how best to find it.

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