



Understanding Quantitative and Qualitative Research Methods: A Theoretical Perspective for Young Researchers

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ABSTRACT

Quantitative and qualitative methods are the engine behind evidence-based outcomes. For decades, one of the popular phenomena that troubled young researchers is that which appropriate research method to employ in their research. Both qualitative and quantitative methods have been further considered in the research methodology, especially in the field of education. In most pieces of research, these approaches are considered to be two functional and necessary methods. The main aim of this paper is to identify the differences between quantitative and qualitative research methods and to evaluate the bright discrepancies between these two factors. Besides, this paper is expected to help young researchers to realize the precise approach and apply it properly in their research. The researchers recommend young researchers use both qualitative and quantitative simultaneously to promote the quality of their research.

Keyword: Research methodology, young researchers, quantitative method, qualitative method.

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Introduction and Literature Review

Qualitative research is called exploratory and is used to discover patterns in ideas and views, whereas quantitative research is used to measure the issue through producing numerical data or data that can be translated into usable statistics. Thus, qualitative studies typically have what, how, and why questions to address research questions that involve the collection of qualitative data rather than quantitative data. Free-form text answers to a questionnaire and a recorded interview are examples of such data. The collected information is the product of more in-depth methods and problems to be acquired. Qualitative researchers use participant observation, in-depth interviews, document analysis, and focus groups to gather and analyze data (Yilmaz, 2013). The researcher may ask open-ended questions or use other strategies, such as framing, projective techniques, and exercise mapping (Barnham, 2015).

In addition to what Tavakol and Sanders (2014) described in quantitative research, quantitative studies are interested in investigating how and why phenomena vary, but in qualitative research, it is not the same as how and why questions are asked. Quantitative studies often use statistical models and statistics for research, producing more objective analytical data. Qualitative research findings characterize relationships, offering responses such as a partnership that is acceptable, good, or excellent, the relationship is therefore not quantified by qualitative analysis studies. The researcher collects mainly quantitative data for quantitative analysis. Hypotheses (which address research questions) require the collection of quantitative data; they are expressed in a manner that provides the best possible response to simple quantitative analyses. For example, the type of relationship (positively related, etc.) and the magnitude of the relationship between variables would need to be obtained by the researcher, the hypotheses state the relationship predicted. The theory offers the expected correlation between variables (Barnham, 2015). Qualitative and quantitative methods of analysis also have their flaws. It is imperative, however, to remember that a greater population and quantifiable data are handled by the quantitative research approach and would thus deliver a more accurate outcome than qualitative research. Study table (1.1):

Table 1.1 shows the basic characteristic for qualitative & quantitative research (Johnson, & Christensen, 2008) & (Lichtman, 2006)

Criteria	Qualitative Research	Quantitative Research
Purpose	To recognize & construe social interactions.	To test theories, look at cause & result, & make expectations.
Group Studied	Lesser & unsystematically selected.	Longer & unsystematically selected.

Variables	Study the entire thing, not the variables.	Specific variables considered
Type of Data Collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open-ended answers, interviews, impressions of participants, field notes, & reflections.	Quantitative data using organized & validated data collection methods based on reliable measurements.
Type of Data Analysis	Identify trends, attributes, themes.	Identify relationships with statistics.
Objectivity and Subjectivity	Subjectivity is predictable.	Objectivity is critical.
Role of Researcher	Participants in the study may be aware of researchers & their prejudices, and participant characteristics may be known to the researcher.	The researcher & their prejudices are not identified to the study participants, & the features of the participant are purposely concealed from the researcher (double blind studies).
Results	Relevant or specialized assumptions that are less generalizable.	Discoveries that can be extended to other populations.
Scientific Method	Exploratory or bottom-up: From the knowledge obtained, the researcher develops a new idea and theory.	Confirmatory or top-down: With the details, the researcher checks the hypothesis and theory.
View of Human Behavior	Dynamic, situational, social, & private.	Systematic & expected.
Most Common Research Objectives	Explore, discover, & build.	Describe, clarify, & expect.
Focus	Wide-angle lens; discusses the scope and depth of phenomena.	Narrow-angle lens; checking a particular hypothesis.
Nature of Observation	In a natural environment, research behavior.	Under regulated conditions, research behavior; isolate causal effects.
Nature of Reality	Subjective; various realities.	Single reality; objective.
Final Report	Narrative report of research participants with contextual definition & direct quotations.	Statistical report with correlations, average comparisons, and effects of statistical significance.

Qualitative Research Design



The root of qualitative research design is related to anthropological and sociological corrections. Various concepts, such as cultural analysis, constructivist model, natural research, phenomenological research, postmodernism, post-positivism mindset, and post-structuralism, have been used to denote the qualitative line of inquiry (Schwandt, 2001). Qualitative research, equivalent to quantitative research, is often demanding, disciplined, systematic, and also offers a realistic alternative approach to quantitative research techniques (Randy & McKenzie, 2011). There are two things that all qualitative methods have in common. Next, the focus on events that exist in the real world in natural settings. And the second is the analysis of certain phenomena with all their difficulties. But in the quantitative method, these facts are vice versa (Leedy & Ormrod, 2010) (Mehrad, & Tahriri, 2019).

Quantitative Research Design

The main aim of quantitative research design is to control the connotation between an independent variable and a population dependent variable or outcome variable. Either descriptive or experimental is this research style. In reality, only relations between variables are formed by descriptive analysis. Also, an experiment produces interconnections. For an accurate evaluation of the relationship between variables, a descriptive analysis also requires a sample of hundreds or even thousands of subjects; only tens of subjects can need an experiment, especially a crossover. When you have a high participation rate in a sample chosen randomly from a population, the assessment of the relationship is less likely to be prejudiced. In studies, if participants are randomly assigned to treatments and if subjects and investigators are blind to the identity of the treatments, partiality is, therefore, less likely. Thus, topic features will affect the partnership you are researching in all revisions. Limit their impact either by using a less heterogeneous subject sample or, ideally, by measuring and using the characteristics in the study. Also, try to quantify variables in an investigation that could explain the process of the treatment. Such variables can help define the magnitude of any placebo effect in an unmixed experiment (Hopkins, 2008) (Mehrad, & Tahriri, 2019).

Qualitative versus Quantitative: Intensive or Extensive

Investigators also face difficulties in choosing intense and thorough studies between two kinds of investigative techniques. The terms of qualitative and quantitative research design are linked to two terms of intensive and detailed analysis. In some ways, the qualitative and quantitative research methods are distinct. Qualitative research design is therefore considered to be one in which the researcher typically grants knowledge rights based on constructivist perspectives (Creswell, 2003). Study such as narratives, phenomenologists, ethnography, grounded theory studies, or case studies is included in the plans that were used in this research design. Quantitative research architecture, by comparison, has different ideas and meanings. The quantitative study is one in which, for example, the researcher mostly uses post-positivist arguments to evolve knowledge; cause and effect reasoning, reduction to individual variables and theories and questions, use of measurements and observations, and the theory test. Experiments and surveys, and predetermined data collection methods that yield statistical



data, are techniques commonly used in this research design. Nevertheless, quantitative research stated by Bryman (2004) typically emphasizes quantification in data collection and analysis. Therefore, the primary difference between qualitative and quantitative research models is the issue of scale or depth versus breadth (Sayer, 1992). For example, there are minimal preliminary changes between the two research designs: research questions, techniques, and data collection methods used, constraints, and how the artifacts are identified. The discrepancies between qualitative and quantitative research, however, are not simply the difference between statistical analysis and in-depth interviews, surveys or case studies, or corroboration and replication tests. The thesis not only answers the issue of methodology, but also the option of a research approach that involves those views or policies that underlie the situation of what is being studied (Randall, Gravier, & Prybutok, 2011). Qualitative and quantitative analysis methods are defined as incommensurable in another country. By focusing on three key features, namely the relation between theory and science, epistemology, and ontology, Bryman (2004) recognized qualitative and quantitative research strategies. Overall, the quantitative study architecture and variables were previously determined by data collection stations. In qualitative research design, however, the calculated variables and variables are versatile and rely to some extent on the data collection context. The quantitative analysis allows the investigator to describe variables that can be counted with numbers carefully. This approach has been interpreted repeatedly as reductionism; that is, it reduces the reality to a number. The qualitative researcher, on the other hand, believed that he was interested in the full or holistic perspective, which involves fundamental beliefs and meaning as part of phenomena (Morse, Swanson, & Kuzel, 2001). The primary interest of the quantitative investigator may not be what factors, with whom, where, where, how, and other relevant data were consumed, which may be of crucial interest to the qualitative investigator. The quantitative model suggests that you can objectively quantify variables. In this approach, the study of the case and effect relationships between or among variables is often of interest. Besides, qualitative approaches presume that it is possible to generate only partly objective accounts of the world and can thus be interpreted in some ways. Quantitative analysis is often partially focused on deductive reasoning, in which inference goes from general to particular. In conclusion, the quantitative investigation includes measuring methods and the study of data expressed in statistics. Qualitative analysis, on the other hand, allows for a more open-ended and versatile evaluation approach (Randall et al., 2011) (Mehrad, & Tahriri, 2019).

Compare Qualitative and Quantitative Sampling

Qualitative and quantitative analysis are distinct concerning the sampling section. In qualitative analysis, concentrating less on the representativeness of a sample than on how social life is illuminated by the sample or limited set of cases, units, or activities, the primary purpose of sampling is to collect precise cases, events or acts that can explain and deeply understand. In qualitative research, it is important to discover cases that will enhance what researchers learn in a particular context about the processes of social life. A presentational survey of a huge number of cases has hardly ever been used in qualitative analysis to intensively analyze the sampled cases. Also, there is a habit of using no chance or non-random sample qualitative analysis. This indicates that the sample size in the development is seldom used by this approach and has little knowledge of the wider group or population from which the sample is taken. The qualitative



researcher chooses cases gradually, with the exact content of a case deciding whether it is selected (Neuman, 2006), unlike in quantitative research using a pre-planned method based on mathematical theory.(Mehrad, &Tahriri, 2019).

Analysis designs are categorized as either qualitative, quantitative, or mixed methods of research. Analysis approaches are commonly assumed to exist in academic paradigms and cultures (Cohen, 2011).As a "set of philosophical assumptions about the phenomena to be studied (ontology), how they can be understood (epistemology), and the purpose and product of research," Kuhn (1970) (cited in Hammersley,2012) examined paradigm. The work of Kuhn accounts for the interpretation of the essence of qualitative and quantitative methods to study used today in educational research.The paradigms are therefore characterized by data collection and analysis methods as well as methodological approaches to studying that has created a great deal of controversy among researchers.Bryman (2008) argued that in their paradigmatic methods, qualitative and quantitative studies vary concerning their epistemological (forms of insight and inquiry into the nature of reality) and ontological (what is to be understood and conclusions about the nature of reality) foundations.Qualitative and quantitative scholars with ontological orientations are, in terms of their methods, constructivism, and objectivism. In epistemological orientation, however, quantitative researchers in their research approach are objectivists and positivists, whereas qualitative researchers in their research approach are subjectivists and anti-positivists (Creswell, 2009).Johnson and Christensen (2012) have also mentioned that a model is a science or research methodology. In educational research, the authors identified qualitative, quantitative, and mixed research as the three main paradigms. Nevertheless, the writers were silent about the basis or orientation on which these paradigms were listed.In their work, Guba and Lincoln (2005) argue that the paradigm is a "belief that guides one in his activity." Guba and Lincoln recognized that human constructions are paradigms and therefore subject to change.The authors refer to the framework as containing four different terms: ethics (axiology), epistemology, ontology, and methodology when dealing with positivism (quantitative researcher) and social constructivism (qualitative researcher). furthermore,four different paradigms associated with social science were defined by Guba and Lincoln (1994) as being: constructivism, critical theory, positivism, and post-positivism. Qualitative research is associated with constructivism and critical theory, while quantitative research is associated with positivism and post-positivism (Eyisi, 2016).

Advantages and disadvantages of qualitative and quantitative research

There has been controversy and arguments over the years about the adequacy of qualitative or quantitative analysis methods in the conduct of social research. Robson (2002) noted that a paradigm war between constructivists and positivists has taken place. But in the sense that each has its specific means of collecting and processing information, the two approaches are incompatible.Besides, even though they have different strengths and rationale, the two approaches are instruments used to accomplish the same purpose using different techniques and



procedures (Paul, 2007; Maxwell, 2004; Maxwell and Loomis, 2002). Both approaches to science fall on a continuum of research (Creswell, 2009, Johnson and Christensen, 2012). It is important to note that the key terms "explaining phenomena" are used in research methods, whether qualitative or quantitative, irrespective of the method (Muijs, 2004). Only the methods of data collection, interpretation, and description of the findings are bound by all the meanings, critiques, claims, and counter-arguments provided by writers about the research approaches. The truth is that neither constructivists nor positivists believed that their instruments were more accurate and legitimate than the others, indicating that they were intended to accomplish the same purpose. Furthermore, it is worth understanding that, because qualitative and quantitative research approaches are focused on different hypotheses and assumptions, depending on the nature of research and data collection techniques, one should be more beneficial than the other and vice versa (Eyisi, 2016).

Advantages of Qualitative Research Approach

Qualitative research was described by Berg and Howard (2012) as meanings, a term, a definition, metaphors, symbols, and a description of things. This description demonstrates that qualitative research includes all the required resources that can elicit a memory that helps solve problems. Thus, to gather data from participants in their natural environments, qualitative data methods such as evaluation, open-ended questions, in-depth interviews (audio or video), and field notes are used. With regard to the participants involved, the techniques used in data collection provide a complete overview of the study. The observation of the participants and the focused group aspect of the qualitative research methodology creates a broader interpretation of behavior. Therefore, the qualitative analysis methodology offers abundant data on individuals and circumstances in real life (De Vaus, 2014; Leedy and Ormrod, 2014). Secondly, in the qualitative research approach, the method by which data is obtained is assumed to be unique. The researcher who serves as an instrument himself relies on the collection of non-numerical primary data such as words and photographs to make qualitative research appropriate for the provision of factual and descriptive information (Johnson & Christensen, 2012). Thirdly, theory arises from data in this research approach. To illustrate the originality and freedom of the qualitative research approach, numerous writers use various terms or phrases such as: 'forensic, do-it-yourself, and bottom-up' (Maxwell, 2013; Shank and Brown, 2007; Johnson & Christensen, 2012). Instead of evaluating data produced elsewhere by other scientists, the advent of data theory allows the researcher to create and recreate hypotheses where appropriate, based on the data he produces. The participants' expressions and perceptions are easily interpreted even though there is little or no data about them (Leedy & Ormrod, 2014). In addition, to understand and appreciate them fully, a qualitative research approach considers human thought and action in a social context and encompasses a broad variety of phenomena. Due to the in-depth study of phenomena, human actions, which include interaction, thought, thinking, composition, and norms, are holistically studied. The strong interaction that occurs between the researcher and the participants in this technique makes it easy for the participant to help shape the analysis. However, as its



participants understand themselves and also understand experience as coherent, this accounts for substantial interpretation of perceptions (Sherman & Webb, 1990; Lichtman, 2013) (Eyisi, 2016).

Disadvantages of Qualitative Research Approach

There are still some criticisms regarding the feasibility of the method, considering the utility of a qualitative research approach for researching problem-solving instruction in the high school science education curriculum. Below are illustrated the concerns associated with using the qualitative analysis method in problem-solving instruction for secondary school science education. Christensen and Johnson (2012) found that the social world is seen by qualitative researchers as being complex and not static. Because of this, instead of generalizing, they restrict their results to the unique category of individuals being studied (De Vaus, 2014). The research methodology is presumably known to have covered a significant proportion of the sample population while studying problem-solving instruction in high school science education. If its result represents a larger population, the qualitative approach may have been a successful tool for the research (Shank and Brown, 2007). Another concern associated with a qualitative research methodology, however, is replicability. Critics of this approach contend that the constructivist has abandoned investigative and investigative scientific techniques and procedures (Cohen, 2011). Furthermore, it is said that the users of the technique write fiction because they have no way of checking their truth claims. Since the approach is characterized by emotions and personal accounts, as opposed to using quantifiable statistics, it is assumed that the approach does not provide accurate and consistent data (Atkins and Wallac, 2012). In addition, as indicated by Bernstein (1974) in Cohen and Morrison, the subjective framework used by the users of the qualitative approach might be incorrect, unreliable, and misleading (2011). The critique of the writers was based on ontological and epistemological paradigms, that is, on how the situation was interpreted and negotiated by the researchers. Researchers enforce their sense and interpretation of a situation on other individuals at a given time and place. Denzin and Lincoln (2005) suggested that the methodology of constructivists is a multidisciplinary field, so their analysis is only exploratory. Finally, qualitative researchers' non-use of numbers makes it difficult and impossible to simplify results and observations. Thus, qualitative researchers assume that there are many aspects of the social world (phenomena and experiences), so theories are based on the researcher's interpretations (Leedy and Ormrod, 2014; De Vaus, 2014). In view of this, it is not possible to provide a proper explanation because the outcome depends on the researcher's explanation at that time to which different researchers may provide a different explanation. The study cannot, therefore, be replicated in another location by another researcher and still get the same results (Williams and May, 1998) (Eyisi, 2016).

Advantages of Quantitative Research Approach



Using statistical data as a method to save time and money is the first benefit of this analysis approach. (Bryman, 2001) argued that the study that emphasizes numbers and figures in data collection and interpretation is the quantitative research method. Quantitative analysis methods should, imperatively, be seen as scientific. The use of statistical data for the explanations and interpretation of the study reduces the time and effort spent by the researcher in explaining his outcome. By using a statistical kit for social science (SPSS) (Gorard, 2001; Connolly, 2007), which saves a lot of energy and time, data (numbers, percentages, and observable figures) can be measured and performed by a computer. Secondly, with this form of approach, the use of scientific methods for data collection and interpretation makes generalization feasible. It's possible to generalize interaction with one party. Likewise, it is not appropriate to see the interpretation of study results as a mere coincidence (Williams and May 1998). In terms of samples, contents, and patterns, the study of problem-solving instruction in secondary school science education within a specific area or zone may represent the broader society (Shank and Brown, 2007; Cohen and Morrison, 2011). Another advantage derivable from the use of this research method, however, is replicability. Since the study methodology essentially relies on the testing of hypotheses, the researcher does not have to do smart guesswork, but rather follow simple guidelines and goals (Lichtman, 2013). Due to its specific aim and guidance, the research study using this type of research method is done in a general or public way and can therefore be replicated at any other time or place and still get the same results (Shank and Brown, 2007). In addition, this approach to analysis provides space for monitoring and study groups to be used. The researcher could decide to break the participants into groups using control groups, giving them the same teaching, but using different teaching methods, taking into account the factors he is researching. The groups will be collected at the end of the study teaching, and the researcher will then test the students' problem-solving ability and be able to use the teaching method that best impacts the students' problem-solving abilities. (2012 by Johnson & Christensen). Eventually, Denscombe (1998) described the quantitative analysis as a research approach to "researcher detachment." It can be seen from one perspective as a force of the quantitative analysis method when looking at the "researcher detachment," but from another angle, it can be seen as its weakness. If the researcher is not in direct contact with the participants, that is, he collects his data through either telephone, internet, or even pencil-paper questionnaire, the problem of the researcher being biased with either his data collection or data analysis would be highly eliminated. Alternatives, such as interpretations, theories, and conclusions, have complete influence. In other words, the researcher's objectivity would not be affected. Secondly, this could maybe guarantee the privacy of respondents (Muijs, 2004; Litchman, 2006; Bryman, 2012; Creswell, 2009).

Disadvantages of Quantitative Research Approach

The separation of researchers from the participants is also a flaw in the approach to quantitative analysis. The isolation of a researcher suggests that he is an "observer" or "outside looking in." It would be incredibly difficult to get an in-depth analysis of the phenomenon within its natural settings with this form of researcher/participant relationship. He may not understand or respect the community or people working with him (Shank & Brown, 2007; Berg, 2007; Christensen and



Johnson, 2012). The researcher should not be an observer or separate himself from the participants in researching problem-solving guidance for science education in secondary schools. It dehumanizes and threatens life and the mind (Cohen, 2011). The experiences gathered may not be those of the mind and opinion of the individual (Berg and Howard, 2012). In any educational study, quality and quantity are very critical, because research is an instrument of change. When describing phenomena, those two terms should not be overlooked (Dabbs, 1982 cited in Berg and Howard, 2012). Thus, in the quantitative research approach, there is no space for participants to add to the analysis. The investigator is in the "driver's seat" (Bryman, 2001). The linear and non-flexible essence of a quantitative method requires that a certain order be followed by the investigator. He begins by setting the research question and hypotheses, performing a literature review, collecting information, analyzing data, and summarizes the result (Litchman, 2006; Creswell, 2009). The researcher may decide to observe the teaching methods first for educational studies such as problem-solving instruction for secondary school science students to see how the method affects students. Following his initial observation, before planning the main study, he could repeat the visit for another observation, if necessary. The participants' feedback will help shape the point of orientation of researchers. Within a quantitative research approach, this method is not feasible, wherein the liturgical order of study does not support many ways of knowing. This is clarified by the use of variables to look for meanings instead of patterns, as Shank and Brown have argued (2007). And if participants have a big argument to make or not, researchers have determined the orientation of the study. With predetermined variables, hypotheses, and architecture, a quantitative research method is characterized as organized (Denscombe, 1998; Bryman, 2012; Creswell, 2009; Christensen and Johnson, 2012). The method does not involve or promote innovative, analytical, and creative thinking as a consequence of using predetermined working strategies (De Vaus, 1996). Any knowledge gathered is aimed at endorsing or opposing the predetermined paradigms. This, however, illustrates that the instrument is successful in learning what is already understood rather than helping to uncover the mystery and revamp the known. Perhaps the results of the studies with this instrument may contribute to the promotion of laws and facts that can stand on their own regardless of whether or not they are valid (Shank and Brown, 2007) (Eyisi, 2016).

Reliability and Validity in Quantitative Research

Reliability means consistency or the degree to which a research instrument reliably tests a given variable every time it is used with the same subjects in the same situation. It is important to note that reliability relates not to measuring instruments, but to data. Researchers may determine the degree to which their methods provide accurate data from distinct viewpoints or approaches. Reliability forms can be briefly explained as follows (Huck, 2000; Keppel, 1991; Trochim, 2005): Reliability of the test-retest refers to the degree that the same test administered by the researcher on two separate occasions to a single group of subjects provides highly positive results. For the investigator to say that they are consistent, two sets of scores from the same test should also be correlated (i.e. assessment of the stability of the instrument over time). Reliability



of parallel forms indicates when two forms of the same instrument administered to the same group of people to test the same attribute as intelligence provides results that are strongly positively correlated. The researcher tests whether the scores obtained for any examinee between the two settings are reliable (i.e. the degree of equivalence across forms). Reliability of internal consistency shows whether measuring instruments possess internal consistency or whether the effects of the instrument applied to a group of people compare very favorably on one occasion. Across the sections of a measuring instrument or sub-sets of queries, there should be continuity. To assess if the whole instrument has high reliability of internal accuracy, the researcher calculates the degree to which parts of a test hang together and calculate the same thing. Reliability of the Inter-rater (Inter Observer) refers to the system by which the researcher collects data by asking raters to evaluate a collection of items, photographs, etc., and then to measure the degree of consistency among the raters. To that end, the researcher measures the interrater reliability index.

Validity refers to the accuracy of data from studies. If the findings of the study measurement process are correct, a researcher's data may be said to be true. That is, to the degree that it calculates what it is supposed to measure, a measurement instrument is valid. Furthermore, there are numerous ways of authenticity. Internal validity refers to whether the treatment and the result have a causal relationship. External validity represents the degree to which clinical findings or the effects of care may be extended beyond the current test conditions, i.e. other cultures, systems, individuals, locations, times, events, or methods. The validity of the construction refers to the degree to which conclusions can be drawn from the operationalization of a study to the theoretical constructs on which operationalization is based. In other words, the framework on which they are based should represent the treatment or the plan. For example, if the research explored the impact of simulation or role-playing on the ability of students to empathize with historical agents, the therapy (simulation) should accurately represent the simulation construct, and the calculated result (historical outcome) should reflect the historical empathy construct. The validity of the inference shows whether there is a correlation between the independent variable and the dependent variable or consequence (Huck, 2000; Keppel, 1991) (Yilmaz, 2013).

Reliability and Validity in Qualitative Research

Rather than using the jargon of quantitative researchers, qualitative researchers tend to use their own words to express in quantitative language what is meant by reliability, validity, and objectivity. Some researchers have also argued that it is not only meaningless but also misleading to evaluate the quality of qualitative studies through quantitative concepts or measures such as reliability and validity (Creswell, 2009, p. 190; Davies & Dodd, 2002; Steinke, 2004; Stenbacka, 2001). Since qualitative analysis in special cases and context-bound focuses on sense and perception, 'conventional generalizability thinking falls short. And in the conventional sense of replicability, reliability is meaningless' (Denzin & Lincoln, 1998). Since qualitative research's ontological, epistemological, and theoretical assumptions are so radically different from those of quantitative research, it is assumed that it should be judged on its terms. It is therefore suggested



that an alternate collection of parameters focused on qualitative principles should be used rather than the concepts of validity and reliability to assess the trustworthiness of a qualitative study that needs its evaluation criteria (Gibbs, 2007; Lincoln & Guba, 1985; Wolcott, 1994). In quantitative research, the concept of validity refers to the concept of integrity, trustworthiness, and authenticity in qualitative research, which implies that the results of the study are correct or real not only from the point of view of the researcher but also from that of the study participants and readers (Creswell & Miller, 2000). In quantitative analysis, the principle of reliability is similar, but not equivalent, to the concept of reliability and suitability in the qualitative study, indicating that the study methodology is consistent over time and through various researchers and methods or projects (Gibbs, 2007; Miles & Huberman, 1994). The following questions compiled from different studies may be asked to judge the consistency of (a) credibility and (b) reliability of a qualitative study (Miles & Huberman, 1994): Credibility (instead of validity) questions:

- How context-rich and informative are the fundamental descriptions?
- Does the account 'ring true' have a 'vicarious presence' for the reader, make sense, seem compelling or plausible?
- Is the account made detailed, respecting in the local sense the configuration and temporal arrangement of elements?
- Generally, has triangulation between complementary approaches and data sources led to converging conclusions? Is there a coherent reason for this, if not?
- Are the data given, if used, related to the prior or emerging theory categories?
- Are the results internally consistent and consistently linked to concepts?
- Are guiding principles used to validate ideas made explicit?
- Are there known areas of uncertainty? Has a negative case or proof been sought? Encountered? Then what happened?
- Have rival theories been deliberately taken into account? What was happening with them?
- Are the findings of the participants involved in the study considered accurate? Is there a coherent reason for this, if not?

Dependability (instead of reliability) questions:

- Are research questions clearly established and the characteristics of the design of the study congruent with them? Are fundamental paradigms and analytical structures obviously specified?
- Are the function and position of the researcher within the site specifically described?
- Will they have equivalent data collection procedures if several field-researchers are involved?



- Do the accounts of multiple observers intersect, in cases, settings, or periods when they might be expected?
- Was data related across the broad spectrum of suitable environments, times, study questions suggested to respondents?
- Have coding tests been made and have appropriate agreements been shown?
- Were data quality tests carried out for bias, deception, awareness of informants, etc.?
- Do results demonstrate meaningful parallelism (informants, contexts, and times) through data sources? Were employed any type of peer or colleague review? (2013, Yilmaz).

Conclusion

Researchers have problems in choosing the appropriate type of study. Many scholars believe that it is possible to use both of them interchangeably. Although the quantitative and qualitative approaches are different when they are used together, they can be complementary (Alzheimer's, 2009); e.g., a researcher can first conduct a focus group to help refine an instrument such as a survey. A researcher who completes a quantitative study, on the other hand, may want to look more in-depth at a specific pattern or phenomenon that was discovered during the phases of data analysis and/or interpretation. Techniques from both traditions can also be used concurrently by researchers. A researcher, for example, may decide to perform a content analysis of an online forum and analyze data obtained from a survey instrument quantitatively. It will be up to you, the researcher, and your advisor (Alzheimer, 2009) to determine which approaches will work best for your research questions and objectives. You must realize that when writing your thesis or dissertation, you are not locked into using one tradition or the other, and both are valuable (Alzheimer, 2009).

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