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A Review of Quantitative and Qualitative Research Traditions for Teacher Education

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Abstract

Research is important to teacher education since teachers are supposed to be active practitioners who are reflective in their practice and able to use research ideas to find a solution to educational problems. Understanding the major research traditions is crucial in teacher education. It is important for teacher education students, especially those at the graduate level to understand issues of research. The purpose of this paper is an attempt to support students in teacher education programs to understand issues about research traditions and how they can be applied. The study examines the two major research traditions, which apply to teacher education and teaching and learning in general. Quantitative and qualitative approaches to research constitute major important paradigms in educational research, in terms of design and implementation. Research is either quantitative, qualitative, or a mixture of the two approaches. Either approach has its philosophical basis and corresponding designs and methods of implementation. Knowing the theoretical/philosophical basis of each approach as well as when and how to use them will enable graduate students in teacher education programs to understand and apply them appropriately to issues in teaching and learning.

Keywords: Quantitative Research, Qualitative Research, Paradigm, Ontology, Epistemology, Methodology, Methods.

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Introduction

Research is important in teacher education in particular and education in general. Many issues in education lend themselves to investigation. To build a corpse of professional teachers and educators, who are active learners, reflective practitioners and researchers, it is important for pre-service teachers, and graduate students in teacher education programs, to have a firm understanding of foundational issues in educational research. These students need to understand the major research paradigms of research, their assumptions, design methodologies and methods of implementation associated with them. They would require an understanding that it is not just the quantitative and qualitative data, which differentiate the two research traditions, which are applicable in education. The two major traditions of research are based on different worldviews or perspectives. Each of the two major traditions has its unique designs and methods. Educational professionals and researchers engage in different types of research. It is therefore important for students of education to have a firm grounding in terms of understanding of the major research traditions available and their processes.

Purpose of the Study

The purpose of this study was to examine quantitative and qualitative research paradigms concerning the philosophical and theoretical basis of these dichotomous, but equally useful, research paradigms and their corresponding design/methodologies and methods of implementation. This is an attempt to provide a guide to students in teacher education and related programs, especially those at the graduate level. That way, they would be clear in their minds about these two major research approaches and how to use them. This is important because a study by Murtonen (2015, p. 695) had indicated for instance that: "many education master students had problems with understanding the basic concepts of research and some of them had severe confusion with the terms empirical, theoretical, qualitative and quantitative".

Method

This study is a literature review on qualitative and qualitative research paradigms. Attempt to support students to have a proper understanding of the two research traditions required a review of existing ideas in the field of research relevant to the topic. The study involved document analysis of published articles and academic documents on qualitative and qualitative research paradigms in terms of their theoretical basis, methodologies of design and methods for data collection and analysis associated with the two traditions. Document analysis relates to reviewing or evaluating both printed and electronic documents, available in the public domain (Bowen, 2009), which are connected with an issue or topic of consideration.

Quantitative and Qualitative Research

Research can be conceptualized as the process of collecting and analyzing data to gain or improve our understanding of a phenomenon, issue, or topic (Creswell, 2012). This process involves stating a question relevant to the issue at stake, collecting data based on the question posed, and analyzing data to find a solution to the problem (Creswell, 2012). Research can be considered as the systematic process through which we, as human beings, can gain knowledge, insight, and understanding about phenomena or something of interest (Merriam, 2009) to a researcher or other entities. The purpose of research especially in the educational setting is and can be, many and varied. Educational research adds to the existing body of knowledge, helps to improve professional practice, and also informs educational policy decisions (Creswell, 2012). Research helps to evaluate the effectiveness and value of the educational policy, practice or intervention as well as finding an antidote to problems confronting particular localities (Creswell, 2012; Crotty, 2012). Educators, school administrators, and curriculum experts seek improvement in educational practice and thereby undertake research to provide new insights into existing contemporary educational issues and phenomena (Creswell, 2012) of interest to them and the education system.

In addition to providing a better understanding of educational issues, research results add to the body of knowledge by providing new and probable ideas of how to solve educational dilemmas. Educational research also helps to improve practice by providing education practitioners with new ideas on how to do things better. It also provides an avenue for educators to evaluate different

approaches to determine which ones are useful to their situation. Additionally, research supports education by informing and influencing educational policy decision-making. Research results help policymakers get informed about an issue and also know what other policymakers have done, and be able to weigh different perspectives (Creswell, 2012) regarding phenomena.

Quantitative-Qualitative Debate

Despite common purposes of research, ideas differ when it comes to how to design and implement research in education and many other fields. Different research traditions help social science researchers to make decisions regarding the appropriateness of research methods to apply in the design and implementation of their studies. The two principal research approaches that are used in designing social science research are quantitative and qualitative research (Yilmaz, 2013) approaches. Social science researchers study many issues and phenomena involving different aspects of human life, intending to describe, explore, and trying to understand social phenomena. Social science studies can range from studies involving large samples of participants and data to studies that involve in-depth investigation and analysis of an individual life. Social scientists use particular and suitable methodologies to design and implement their studies. The large pool of methodologies at the disposal of social scientists largely falls into the broad category of quantitative and qualitative approaches (Tuli, 2011). A study is either quantitative, qualitative or a mixture of the two approaches.

It is not for nothing that social science researchers would choose particular methodologies for their studies. They usually have a compelling reason for choosing particular methodological approaches over others for a study. Researchers have their assumptions about the nature of reality and knowledge construction. The assumptions they hold influence their selection of methodology for a study (Tuli, 2011). Assumptions are important and how we handle them to make a difference in research. Quantitative and qualitative research designs and their implementation are based on particular paradigms, which mark these approaches as different from each other. Research paradigms are "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways" (Guba & Lincoln, 1994, p. 105). Paradigm guides the research process based on the researcher's beliefs in respect of ontology, epistemology, and methodology (Tuli, 2011) appropriate for a study. Quantitative and qualitative research approaches differ due to the differences in the philosophical foundations (Yilmaz, 2013). In both research approaches, assumptions that the researcher holds influence and justify the choice of methodology. The methodology also influences appropriate methods for a study (Crotty, 2012; Tuli, 2011). Proper design with appropriate methods ensures the robustness and trustworthiness of a study process and its outcome.

Quantitative Research Approach

Quantitative research can be seen as a research approach that aims at explaining phenomena according to numerical data, which are analyzed through mathematically based methods like statistics. The quantitative research approach is usually labeled as a more "scientific" approach of doing scientific research, which focuses on the use of "specific definitions and carefully operationalizing what particular concepts and variables mean" (Tewksbury, 2009, p. 39). Quantitative research, characteristically, involves a process aimed at describing trends or providing an explanation for an existing relationship between and among variables. This approach to research also involves comparing groups through statistical means, and interpretation of results regarding either existing research or predictions (Creswell, 2012) about the future.

Quantitative methods require adherence to the use of standardized measures which enables divergent experiences and opinions of people to fit into a few sets of pre-arranged responses with corresponding numbers assigned to them (Patton, 1990). This type of research finds its roots in the natural sciences but also found application in social science for most of the 20th century, to study certain phenomena that could be observed and measured objectively with processes and outcomes that are repeatable and generalizable, respectively (Tuli, 2011). Quantitative research methods are informed by a certain worldview or research paradigm. Thus, it has certain ontological, epistemological, theoretical/philosophical assumptions, which come along with certain methodologies and methods.

Theoretical Paradigm Associated with Quantitative Research

Theoretical orientation or paradigm refers to the philosophical position of the researcher, which serves as justification for selecting research methodology for a study and also provides context for the study (Crotty, 2012). Quantitative research methods align with the ideals of positivism, as a paradigm of social research (Sale, Lohfeld, & Brazil, 2002). Positivism connotes an "assumption of a fixed, measurable reality external to people" (Tuli, 2011, p. 103). It is a philosophical orientation that holds an assumption that truth or reality exists out there (independence of human consciousness) to be discovered. It holds the belief that there are universal laws that control human activities and therefore, identification of such governing laws will help in describing, predicting, and even controlling social phenomena. Therefore, with relevant instruments, we can easily measure truth and discover the reality. This is because reality is observable and stable.

Positivists believe knowledge and understanding obtained through such a process is assumed to be scientific and can be considered as part of the laws of nature (Sale, Lohfeld, & Brazil, 2002; Tuli, 2011). This is because "[s]cience is characterized by empirical research; all phenomena can be reduced to empirical indicators which represent the truth" (Sale, Lohfeld, & Brazil, 2002, p. 44). Experimental quantitative research portrays this positivist philosophical orientation (Merriam, 2009). Positivism is firmly rooted in the objectivist epistemological orientation that assumes objective reality, considered independent and external to human consciousness. This type of reality is assumed to be stable and can be observed and measured, given appropriate tools (Crotty, 2012; Merriam, 2009).

Ontological Assumptions Connected with Quantitative Research

Ontological assumption in social science research relates to the nature of reality, its existence and what can be known about them (Crotty, 2012; Guba & Lincoln, 1994; Ponterotto, 2005; Tuli, 2011). Ontological issues most usually move in concert with epistemological considerations (Crotty, 2012). Ontologically, quantitative research posits a paradigm that asserts the existence of objective reality, with an assumption that a single truth exists independent of human perception and consciousness (Sale, Lohfeld, & Brazil, 2002). Quantitative research is based on the ideals of positivism because the assumption of the existence of objective reality also comes with an understanding that a phenomenon can be and should be studied without any influence of the researcher (Tuli, 2011). Positivism is linked to realism because of positivists' assumption of "naïve realism-"real reality" independence of human consciousness (Crotty, 2012, p. 10; Guba & Lincoln, 1994). Since positivists assume the existence of real-world things, scientific inquiry, including the quantitative method seeks to know how things are or how they work. Any other endeavor outside of this parameter is deemed unscientific (Guba & Lincoln, 1994).

Epistemological Assumptions Connected with Quantitative Research

Epistemology constitutes a theory of knowledge that underpins a particular theoretical orientation and its attendant methodologies (Crotty, 2012). Epistemology focuses on "understanding what it means to know" (Crotty, 2012, p. 10) as well as the relationship between the knower and the known or what is to be known (Guba & Lincoln, 1994). Ontological assumptions affect this kind of subject-object relationship in pursuit of knowledge and reality. Positivism assumes objectivism and dualism. That is objectivists believe in the existence of objective or real/meaningful reality outside of human consciousness, which can be discovered independently. That is the subject and object are independent of each other and the researcher can study any object without influencing it and vice versa (Crotty, 2012; Tuli, 2011). Positivists epistemology prescribes fixed research designs (Tuli, 2011) since it is believed that findings obtained through rigorous scientific methods are true (Sale, Lohfeld, & Brazil, 2002; Guba & Lincoln, 1994). Reality exists out there, waiting for human discovery. Investigations and research within the positivist paradigm should be carried out through a "one-way mirror" and supposed to be free from any biases on the part of the investigator (Guba & Lincoln, 1994, p. 110) so that by this, the unfettered reality can be arrived at.

Methodology Connected with Quantitative Research

An issue of consideration in research design and implementation is how the investigator would be able to find out what he or she purports to know. The question is. through what process of design would the investigator find out what the study seeks to discover? This question addresses methodological issues in research (Guba & Lincoln, 1994). Research methodology constitutes a plan of action or design that

informs a researcher's selection of methods for a study, which is mostly influenced by one's theoretical paradigm (Crotty, 2012; Tuli, 2011). Quantitative approaches are influenced by positivists' orientation (Guba & Lincoln, 1994), therefore, methodologies of quantitative research are fixed designs because they ensure control of possible confounding variables, in search of objective reality (Tuli, 2011; Guba & Lincoln, 1994). Some of the methodologies applied in quantitative research are positivists' experimental designs, survey designs (Merriam, 2009; Guba & Lincoln, 1994), quasi-experimental designs (Merriam, 2009), and correlational designs (Creswell, 2012), which are mostly pre-determined, with a focus attention on confirmation of formulated hypotheses (Guba & Lincoln, 1994).

Experimental designs

Experimental designs are research approaches that are used to test ideas to ascertain their influence on an outcome. Usually, researchers identify an idea or intervention, intentionally assign people to experience the phenomenon, and use scientific methods to find out if those who were exposed to the phenomenon would outperform those who did not experience it. This process involves controlling all confounding variables except for the independent variable (Creswell, 2012) in the study. Experimental designs are usually applied when the researcher wants to determine the cause and effects of events or ideas (Creswell, 2012; Merriam, 2009). The design is also applicable in predictions of future occurrence of events (Merriam, 2009). Some examples of experimental designs are between-group designs, comprising true experiments, quasi-experiments, and factorial designs; and within-group/individual designs, including time-series experiments, repeated measures experiments, and single-subject experiments. The differences among these designs are based on many characteristics including, and not limited to, how participants are randomly assigned to groups, the number of groups/individuals that a design compares, as well as the number of interventions implemented in the study (Creswell, 2012).

Survey Designs

Survey designs are approaches in quantitative research, which enable a researcher to describe the characteristics of a population in respect of phenomena through the administration of a survey instrument to a population or sample of that population (Creswell, 2012). Such designs are employed to describe characteristics of a phenomenon, distribution of variables among a population as well as the relationship between variables (Merriam, 2009). Survey designs differ from experimental design because survey designs do not involve the treatment of participants or the manipulation of conditions (Creswell, 2012). Survey designs are a research option when there is a need to describe trends in respect of policy implementation. Surveys can also be used to obtain information regarding people's opinions on policy issues or to identify the beliefs and attitudes of people. They are also useful for program evaluation.

Methods Connected with Quantitative Research

Methods are simple techniques that are used by a researcher to gather and analyze data for a study. The kind of research methodology used for a study design determines the appropriate methods for data collection and analysis (Crotty, 2012) germane to a study. Quantitative research has a standard and predictive pattern that guides its design and implementation. Such patterns include "introduction, review of literature, methods, results, and discussion" (Creswell, 2012, p. 15) sections. Quantitative research methods always involve a large sample of participants, randomly selected to ensure generalization of research outcomes to a larger population (Yilmaz, 2013; Meriam, 2009). For data collection purposes, quantitative researchers use pre-constructed data collection instruments, with pre-determined responses, for participants to respond to or choose from (Yilmaz, 2013). Some of these instruments are a questionnaire, tests, inventories, Likert scale/Likert-like scale, checklist (Tuli, 2011; Merrian, 2009), which are mostly inanimate (Merrian, 2009).

Quantitative researchers also rely on deductive and descriptive and or inferential statistical procedures for data analysis (Tuli, 2011; Merriam, 2009). Descriptive statistics are used to summarize data to show trends, variability, and relativity of scores in data. It measures central tendency including mean, mode, and median; variability or spread comprising variance, standard deviation, and range; as well as relative standing of scores, which are z-score, and percentile ranks. Inferential statistics are also used

to analyze data from a sample to generalize or draw some conclusions relative to a larger population (Creswell, 2012).

Validity and reliability are important in research. Validity in quantitative research is heavily dependent on the careful construction of instruments of data collection to strengthen its capacity to measure what it purports to measure. Therefore, the attention of validity focuses on the suitability of instruments of data collection, including surveys, test items, Likert scale, etc. (Patton, 1990). Reliability in quantitative research, according to Creswell (2012) is measured through one or combinations of these procedures: test-retest reliability, alternate forms reliability, inter-rater reliability, and internal consistency reliability.

Information Obtained Through Quantitative Methods

Quantitative methods collect and analyze numerical data because it tries to quantify social phenomena (Tuli, 2011). It focuses on "the measurement of and analysis of the causal relationship between isolated variables within a framework that is value-free, logical, reductionistic, and deterministic, based on a priori theories" (Yilmaz, 2013, p. 312). Apart from determining causal relationships, quantitative research methods are employed to obtain information for predicting or describing distribution among a population. Quantitative methods are useful in gathering data and analyzing data to confirm or reject the hypothesis (Merriam, 2009). With its background in objectivist epistemology, objectivism, and realism (positivism), quantitative methods focus on trying to "develop explanatory universal laws in social behaviors by statistically measuring what it assumes to be a static reality" (Yilmaz, 2013, p. 312).

Quantitative methods help researchers to obtain data from a large number of participants, using instruments with sets of preset questions and responses. This helps in describing trends, making a comparison between and among groups, relating variables and aggregation of data. Large data associated with quantitative methods help researchers to arrive at a set of findings that are generalizable to a larger population (Yilmaz, 2013; Creswell, 2012; Ponterotto, 2005) because of the representativeness of the sample selected and used in a study.

Quantitative research aims to predict the outcome of a study to a larger population (Merriam, 2009; Ponterotto, 2005) and to ensure replication of the study (Tuli, 2011). That is, findings of quantitative research are numerical, precise and usually generalizable to a larger population. However, quantitative research fails to provide insight into the experiences of participants due to its reliance on the deductive approach and predetermined responses, based on a theory (Yilmaz, 2013). Other means are needed to capture the experiences of people rather than predetermined responses.

Qualitative Research Methods

Qualitative research refers to a set of techniques, applied in social science, in which data are obtained from a small group of people, as respondents, and are analyzed with non-statistical means. This type of social science research involves detailed descriptions of characteristics, cases, and settings, and it employs observation, interviewing, and document review to gather data. (Meurer, Frederiksen, Majersik, Zhang, Sandretto, & Scott, 2007).

Merriam (2009) sees qualitative research as a type of research, which is inductive, richly and thickly descriptive, in nature, and primarily focuses on the process of the investigation, understanding, and meaning of the phenomenon. She further indicates that qualitative research is more about quality than quantity. According to Tuli (2011) qualitative research is "emergent, inductive, interpretive and naturalistic approach to the study of people, cases, phenomena, social situations and processes in their natural settings in order to reveal in descriptive terms, the meanings that people attach to their experiences of the world"(p. 312).

Quantitative research dominated the social science research scene for most part of the 20th century. As time went on, researchers within the social sciences started doubting and objecting to the validity of the quantitative approach to social science research, in connection with the construction of knowledge and understanding about hum experiences. The view was that research needs to focus on the understanding, which individuals have for the phenomenon being studied. It was this process, which led to the coming into being of qualitative research, as an alternative approach (Tuli, 2011).

Qualitative research focuses on attention and consideration of the research process, context, interpretation, meaning, which are obtained through inductive reasoning (Yilmaz, 2013). Qualitative research also explores issues and develops an understanding of phenomena (Creswell, 2012). Qualitative research has many other unique, but relevant, qualities. It is considered naturalistic due to its focus on understanding real-world phenomena un-manipulatively. They are holistic, in that, they focus on understanding the phenomenon in totality. They are flexible and dynamic, unlike quantitative research, since it avoids rigidity in design and are adaptable to changing situations in the research process (Patton, 1990).

Philosophical/Theoretical Orientation of Qualitative Research

Qualitative research approaches belong to interpretivism, a term that is often used interchangeably with or connected to both constructivism (Tuli, 2011; Merriam, 2009) and constructionism (Crotty, 2012). Symbolic interaction, phenomenology (Crotty, 2012; Merriam, 2009), and hermeneutics (Crotty, 2012) are some of the important elements in the interpretive paradigm. Interpretivism is a philosophical orientation that assumes that there is no single, observable reality. Rather reality is socially constructed and there are multiple realities or interpretations of a single event or reality. The world is complex and constantly evolving. Interpretvists believe that researchers do not discover knowledge, but knowledge is constructed (Tuli, 2011; Merriam, 2009). This paradigm aims at understanding peoples' experiences (Merriam, 2009).

Ontological Basis of Qualitative Research

Ontologically, qualitative research is linked to relativism, which assumes multiple, locally constructed and contextualized realities (Guba & Lincoln, 1994). Interpretivism rejects positivists' contention of naïve realism, which presupposes the existence of single, true reality outside of human consciousness, which can be apprehended, identified, and measured (Tuli, 2011; Ponterotto, 2005; Sale, Lohfeld, & Brazil, 2002). Instead, interpretivism-constructivists believe in relativism of reality rather than one objective reality (Ponterotto, 2005). Ontologically, interpretivism is about existence of multiple, subjective realities (Ponterotto, 2005; Sale, Lohfeld, & Brazil, 2002), which are based on human construction of reality (Merriam, 2009; Sale, Lohfeld, & Brazil, 2002) influenced by many contextual factors such as "the individual's experience and perceptions, the social environment, and the interaction between the individual and the researcher" (Ponterotto, 2005, p. 130).

Epistemological Basis of qualitative research

Epistemologically, the qualitative approach aligns with constructionism and rejects positivist-objectivist assumptions of human knowledge, understanding, and reality. Constructionism with a foundation in interpretivism assumes there is no objective truth to be discovered by man. It assumes that it is impossible to have meaning without directing your mind and consciousness to an object. It also vehemently opposes positivists- objectivists' dualist mentality as far human relation with an object in the construction of reality (Crotty, 2012). Instead, qualitative research is aligned with constructionists' assumption of transactional and subjectivism, as far as the relationship and contribution of both the researcher and research participants is concerned. The understanding here is that reality is socially constructed. Both the researcher and the researched contribute to the meaning-making process and its outcome. Therefore, the nature of the interaction between a researcher and participant is important as far as gathering data, describing and understanding the experiences of a participant is concerned (Ponterotto, 2005; Guba & Lincoln, 1994). Because knowledge is constructed through human-human interaction and engagement with objects in the world, there are multiple realities (Crotty, 2012). In other words, there is no single objectified reality since people construct meaning differently based on a given phenomenon.

Methodology of Qualitative Research

The qualitative research approach has many research designs or methodologies, which are uniquely different as far as their intent and purpose are concerned. Examples of qualitative methodologies include phenomenology, ethnography, case studies, narrative research, and grounded theory (Creswell, 2012). All qualitative research methodologies treat participants as human beings, not objects. Participants are enabled to make sense of their situations, appreciate their construction of knowledge

and understanding because the methods focus on how people understand and interpret their experiences (Tuli, 2011) of the world they live in. Qualitative research approaches are considered flexible in design. That is, the methodologies are evolving and emerging in design and studies topics contextually (Yilmaz, 2013; Tuli, 2011; Merriam, 2009).

Phenomenology

Phenomenology is a qualitative research design, which emphasizes on descriptive study of human experience (Wertz, Charmaz, McMullen, Josselson, Anderson, & McSpadden, 2011). Phenomenology is sometimes viewed as a paradigm, methodology or even a method of qualitative or naturalistic study (Patton, 1990). However, as a qualitative research design, phenomenology focuses on the structure and essence of human experience, in respect of a phenomenon. The phenomenon being experienced can be anything including, but not limited to, a program, institution, job, or an emotional issue. Phenomenology emerged from the work of Edmund Husserl in the 20th century with a focus on studying how to describe or interpret human experience of phenomena (Patton, 1990). Having been influenced by the ideas of Brentano, Husserl aimed at developing appropriate methods for studying human conscious experience that defies the assumptions of positivist objectivism (Wertz, et al., 2011).

Ethnography

Ethnography is another qualitative design to research, which focuses on studying the culture of a group of people. Ethnographic designs are used to describe, analyze, and give interpretation in respect of a group's way of life-language, beliefs, attitudes, and values. Ethnographers immerse themselves with the people through participant observation and intensive fieldwork to examine and understand the people in their natural setting, their living place or work environment and taking note of their daily interactions. The basic assumption underlying ethnographic studies is the idea that culture evolves when a group of people live together for a long time (Creswell, 2012; Patton, 1990).

Grounded theory

Grounded theory as a qualitative design, involves the use of a systematic process of generating a general explanation in respect of interaction among people. Unlike ethnography, which focuses on a particular group of people, grounded theory focuses on studying several individuals who have experienced a phenomenon. The explanation offered in grounded theory is always based on the data gathered. The process involves data collection, development of categories and relating it to data, and drawing a visual model to portray an explanation by offering statements about peoples' experiences (Creswell, 2012). Grounded theory is credited to Glaser and Strauss, who wanted an inductive way of analyzing data for constructing sociological theory (Wertz, et al 2011).

Narrative Research

Narrative research is another qualitative methodology, which unlike other approaches, focuses on describing the lives, stories, and for that matter, experiences of individuals, rather describing the experience of a group or theorizing about a group of individuals. This type of research is especially popular in the educational setting (Creswell, 2011).

Methods of Qualitative Research

Qualitative approach utilizes small, nonrandom, purposeful, and theoretical sampling (Merriam, 2009) to gather detailed information and an in-depth understanding of social phenomena (Yilmaz, 2013). Data collection for qualitative research usually involves engagement in the fieldwork. Qualitative researchers normally spend a considerable amount of time in the setting of their study. The setting can be a program, community, or institution. The purpose of fieldwork is to observe and later conduct an interview (Patton, 1990). Researchers with interpretivism perspectives are primary instruments, and they use in-depth interviews, observations, document review, focus group discussions and audiovisual materials to collect data (Creswell, 2012; Tuli, 2011; Merriam, 2009). Information obtained through qualitative sources is written in detail in order not deviate from the voice of the people. Because of this interviews and focus group, discussions are tape recording and later transcribed verbatim.

Data from interviews consists of people's direct expression of their experiences, knowledge, as well as their feelings regarding a phenomenon. Data obtained through observation are concerned primarily

with detailed accounts of activities, behaviors, actions, attitudes, and interpersonal relationships, as well as the organizational process and structure of the people as observed by the researcher. Document review is also used to gather relevant information already existing from many and varied sources, including expert ideas, direct quotations of people, program records, memoranda, correspondence, official publications, reports, personal diaries (Patton, 1990).

In qualitative research, data is analyzed for description and identification of relevant themes by using text analysis and also interpreting the meaning of findings in a study (Creswell, 2012). The analysis procedure in qualitative research involves non-numerical, inductive, and the constant comparison method of data analysis (Tuli, 2011; Merriam, 2009). The analysis is inductive in the sense that the researcher does not attempt to make sense of the information gathered based on his assumptions and biases regarding the phenomenon. Instead, an attempt is made to consciously put aside one's biases and allow the data to speak for itself (Patton, 1990). Validity and reliability referred to as trustworthiness and credibility are important in qualitative research. Since the researcher is considered an instrument in qualitative research, validity in qualitative research depends largely on the sensitivity, skills, competence, integrity, and the rigor with which the researcher approach both the design and implementation of qualitative research (Patton, 1990). According to Creswell (2012), qualitative researchers use many means to check reliability, including triangulation of data, member checking, and external audit.

Information Obtained in Qualitative Research

Qualitative research usually involves the collection of data primarily based on words from a relatively small number of participants (Creswell, 2012) and data obtained in qualitative research reflect personal opinions, feedback and individual perspectives of particular people regarding a phenomenon (Montgomery, 2011). Unlike quantitative research designs, which seek to predict future occurrence or determine causal relationships between variables, qualitative research aims at describing, interpreting, and trying to understand the experiences of people regarding a phenomenon. It also aims at generating, rather than testing hypotheses (Yilmaz, 2013; Merriam, 2009). Qualitative research seeks to gather relevant information that helps to uncover how people construct and interpret their experiences as well as the meaning they assign to their experiences of the phenomenon they are involved in (Tuli, 2011; Merriam, 2009). Qualitative research seeks the type of information that makes it possible for us to understand why people act in certain ways and why things are the way they are in the social setting (Tuli, 2011). Qualitative approaches are very useful in obtaining a very useful and detailed data about a much smaller number of people and cases or situations, which deepens understanding of the phenomenon under consideration (Patton, 1990). Indeed the findings of qualitative research are rich, comprehensive, holistic, descriptive, and expansive (Merriam, 2009) in nature. In other words, the nature of qualitative research, taking together, reduces generalizability (Patton, 1990), though generalizability has never been the focus of qualitative research.

Conclusion

An understanding of research approaches applicable to education is important in teacher education. Teachers should be active learners; reflective practitioners and their professional practices should be guided by research. Because many students have challenges understanding issues of research, it is important to support graduate students in teacher education and related programs with ideas that will help them to appreciate and understand the distinctive issues and processes involved in the two dichotomous research traditions. Educational research usually falls into quantitative, qualitative, or sometimes a mixture of both traditions. Both quantitative and qualitative research traditions are related because they are all means of gathering and interpreting information about human phenomena, from human participants. They are all useful as far as investigating into issues of education, teaching and learning is concerned. However, they have their relative strengths and weaknesses and constitute alternative means of doing research (Patton, 1990). The relative preference and divergence of the two research traditions and their applications go beyond what their names merely suggest. They are based on certain philosophical/theoretical paradigms and assumptions. The different worldview embodied in each tradition informs certain methodologies of research design and appropriate methods of data collection and analysis. Again, information that results from the two approaches also differs. Teacher

education students need an understanding of the philosophical basis of quantitative and qualitative research, methodologies and methods appropriate in each circumstance and purpose of using them. That understanding will enable them become teachers who can use tools of research to look into issues of teaching and learning and learn from their practice. This will help them to improve upon their professional practice as well as students' learning and experience.

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