

Research Methods

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ABSTRACT

This paper discusses three common research approaches, qualitative, quantitative, and mixed methods, along with the various research designs commonly used when conducting research within the framework of each approach. Creswell (2002) noted that quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study, while qualitative research is the approach to data collection, analysis, and report writing differing from the traditional, quantitative approaches. This paper provides a further distinction between quantitative and qualitative research methods. This paper also presents a summary of the different research methods to conduct research in quantitative, qualitative, and mixed methods studies.

INTRODUCTION

Individuals generally accept sensory knowledge as truth because it provides a level of evidence that one can withstand or challenge. All sensory knowledge accepted as true belief has been classified as empirical or a posteriori knowledge. On the other hand, non-empirical or a priori knowledge has been widely accepted within the realm of philosophical approaches to knowledge creation because it explains or justifies knowledge independent of the sensory experience. The fundamental principals of posteriori and priori knowledge are the theoretical underpinnings to quantitative and qualitative research methods. Each research method is designed to explore specific research questions and attempts to address the postpositivist approach of challenging the traditional belief of absolute truth. This paper defines research and will present a clear statement of what constitutes quantitative and qualitative research designs and summarizes techniques used to conduct research studies for both approaches as well as the mixed methods approach.

RESEARCH

Research is at times mistaken for gathering information, documenting facts, and rummaging for information (Leedy & Ormrod, 2001). Research is the process of collecting, analyzing, and interpreting data in order to understand a phenomenon (Leedy & Ormrod). The research process is systematic in that defining the objective, managing the data, and communicating the findings occur within established frameworks and in accordance with existing guidelines. The frameworks and guidelines provide researchers with an indication of what to include in the research, how to perform the research, and what types of inferences are probable based on the data collected.

Research originates with at least one question about one phenomenon of interest. For example, what competencies might inhibit or enhance the accession of women into senior leadership positions (Williams, 2005)? Or, what leadership factors might influence the retention choices of registered nurses? Research questions, such as the two preceding questions, help researchers to focus thoughts, manage efforts, and choose the appropriate approach, or perspective from which to make sense of each phenomenon of interest.

The three common approaches to conducting research are quantitative, qualitative, and mixed methods. The researcher anticipates the type of data needed to respond to the research question. For instance, is numerical, textual, or both numerical and textual data needed? Based on this assessment, the researcher selects one of the three aforementioned approaches to conduct research. Researchers typically select the quantitative approach to respond to research questions requiring numerical data, the qualitative approach for research questions requiring textual data, and the mixed methods approach for research questions requiring both numerical and textual data.

QUANTITATIVE RESEARCH APPROACH

Quantitative research emerged around 1250 A.D. and was driven by investigators with the need to quantify data. Since then quantitative research has dominated the western cultural as the research method to create meaning and new knowledge. What constitutes a quantitative research method involves a numeric or statistical approach to research design. Leedy and Ormrod (2001) alleged that quantitative research is specific in its surveying and experimentation, as it builds upon existing theories. The methodology of a quantitative research maintains the assumption of an empiricist paradigm (Creswell, 2003). The research itself is independent of the researcher. As a result, data is used to objectively measure reality. Quantitative research creates meaning through objectivity uncovered in the collected data.

Quantitative research can be used in response to relational questions of variables within the research. “Quantitative researchers seek explanations and predictions that will generate to other persons and places. The intent is to establish, confirm, or validate relationships and to develop generalizations that contribute to theory” (Leedy and Ormrod, 2001, p. 102). Quantitative research begins with a problem statement and involves the formation of a hypothesis, a literature review, and a quantitative data analysis. Creswell (2003) states, quantitative research “employ strategies of inquiry such as experimental and surveys, and collect data on predetermined instruments that yield statistical data” (p. 18). The findings from quantitative research can be predictive, explanatory, and confirming. The next section focuses on quantitative research methodology.

QUANTITATIVE RESEARCH METHODOLOGY

Research methodology is defined by Leedy & Ormrod (2001) as “the general approach the researcher takes in carrying out the research project” (p. 14). Quantitative research involves the collection of data so that information can be quantified and subjected to statistical treatment in order to support or refute “alternate knowledge claims” (Creswell, 2003, p. 153). Creswell, (2002) asserts that quantitative research originated in the physical sciences, particularly in chemistry and physics. The researcher uses mathematical models as the methodology of data analysis. Three historical trends pertaining to quantitative research include research design, test and measurement procedures, and statistical analysis. Quantitative research also involves data collection that is typically numeric and the researcher tends to use mathematical models as the methodology of data analysis. Additionally, the researcher uses the inquiry methods to ensure alignment with statistical data collection methodology.

There are three broad classifications of quantitative research: descriptive experimental and causal comparative (Leedy and Ormrod, 2001). The descriptive research approach is a basic research method that examines the situation, as it exists in its current state. Descriptive research involves identification of attributes of a particular phenomenon based on an observational basis, or the exploration of correlation between two or more phenomena.

During the experimental research, the researcher investigates the treatment of an intervention into the study group and then measures the outcomes of the treatment. There are three types of exploratory approaches: pre-experimental, true experimental, and quasi-experimental (Leedy & Ormrod). The pre-experimental design involves an independent variable that does not vary or a control group that is not randomly selected. Campbell and Stanley (1963) endorsed the true experimental design, which provides a higher degree of control in the experiment and produces a higher degree of validity. The true experimental designs result in a systemic approach to quantitative data collection involving mathematical models in the analyses. Where as, the quasi-experimental design involves nonrandom selection of study participants. Therefore, control is limited and true experimentation is not possible. Since the variable cannot be controlled, validity may be sacrificed.

In the causal comparative research, the researcher examines how the independent variables re affected by the dependent variables and involves cause and effect relationships between the variables. The factorial design focuses on two or more categories with the independent variables as compared to the dependent variable (Vogt, 1999). The causal comparative research design provides the researcher the opportunity to examine the interaction between independent variables and their influence on dependent variables.

METHODS TO CONDUCT QUANTITATIVE RESEARCH

Several research methods exist to conduct quantitative research. In descriptive research method, correlational, developmental design, observational studies, and survey research are used. These research methods may also be used in various degrees with experimental and causal comparative research.

In the correlational research method, the research examines the differences between the two characteristics of the study group. Leedy and Ormrod (2001) felt that it is crucial to observe the extent to which a researcher discovers statistical correlation between two characteristics depending on some degree of how well those characteristics have been calculated. Hence, validity and reliability are important components that affect correlation coefficients. Bold (2001) noted that the purpose of a correlational study is to establish whether two or more variables are related. Creswell (2002) defined correlation as a statistical test to establish patterns for two variables. The statistical analysis of the research question can be conducted through a progression or sequence of analyses using a standard test for correlation that produces a result called “r.” The r coefficient is reported with a decimal numeral in a process known as the Pearson Correlation Coefficient (Cooper and Schindler, 2001).

During the development design, the researcher explores how characteristics may change over time within a study group. Two types of development designs include cross-sectional and longitudinal. In the cross-sectional study, the researcher compares two different groups within the same parameters. Whereas, the longitudinal study is commonly used in child development research to better understand a phenomena of particular age groups or to study a group over a specific period of time (Leedy and Ormrod, 2001).

In the observational study method, the researcher observes a particular aspect of human behavior with as much objectivity as possible and records the data. This research method may provide an alternative to various qualitative research methods. In the survey research method, the researcher tends to capture phenomena at the moment. This method is used for sampling data from respondents that are representative of a population and uses a closed ended instrument or open-ended items. A survey research is one of the ways to gather data in the social sciences.

QUALITATIVE RESEARCH APPROACH

Qualitative research is a holistic approach that involves discovery. Qualitative research is also described as an unfolding model that occurs in a natural setting that enables the researcher to develop a level of detail from high involvement in the actual experiences (Creswell, 1994). One identifier of a qualitative research is the social phenomenon being investigated from the participant’s viewpoint. There are different types of research designs that use qualitative research techniques to frame the research approach. As a result, the different techniques have a dramatic effect on the research strategies explored.

What constitutes qualitative research involves purposeful use for describing, explaining, and interpreting collected data. Leedy and Ormrod (2001) alleged that qualitative research is less structured in description because it formulates and builds new theories. Qualitative research can also be described as an effective model that occurs in a natural setting that enables the researcher to develop a level of detail from being highly involved in the actual experiences (Creswell, 2003).

Qualitative research is conducted within a poststructuralist paradigm. There are five areas of qualitative research: case study, ethnography study, phenomenological study, grounded theory study, and content analysis. These five areas are representative of research that is built upon inductive reasoning and associated methodologies.

Qualitative research builds its premises on inductive, rather than deductive reasoning. It is from the observational elements that pose questions that the researcher attempts to explain. The strong correlation between the observer and the data is a marked difference from quantitative research, where the researcher is strictly outside of the phenomena being investigated. There is no beginning point of truth or any established assumptions from which the

researcher can begin (Leedy and Ormrod, 2001). This empirical research is data collected from the senses and is used to explain phenomena relevant to social behaviors in new and emerging theories. In addition to the distinct differences between quantitative and qualitative research designs, notable differences have also been identified in each respective research methodology. The following sections will briefly describe the qualitative research methodology.

QUALITATIVE RESEARCH METHODOLOGY

There are several different methods for conducting a qualitative research; however, Leedy and Ormrod (2001) recommend the following five: Case studies, grounded theory, ethnography, content analysis, and phenomenological. Creswell (2003) describes how these methods meet different needs. For instance, case studies and the grounded theory research explore processes, activities, and events while ethnographic research analyses broad cultural-sharing behaviors of individuals or groups. Case studies as well as phenomenology can be used to study individuals.

Case Study

Creswell (2003) define case study as “researcher explores in depth a program, an event, an activity, a process, or one or more individuals” (p. 15). Leedy and Ormrod (2001) further require a case study to have a defined time frame. The case study can be either a single case or a case bounded by time and place (Creswell, 1998). Leedy and Ormrod (2001) provide several examples from different disciplines such as a medical research studying a rare illness (event) or political science research on a presidential campaign (activity). Leedy and Ormrod (2001) state, case studies attempt to learn “more about a little known or poorly understood situation” (p.149). Creswell (1998) suggests the structure of a case study should be the problem, the context, the issues, and the lessons learned. The data collection for a case study is extensive and draws from multiple sources such as direct or participant observations, interviews, archival records or documents, physical artifacts, and audiovisual materials. The researcher must spend time on-site interacting with the people studied. The report would include lessons learned or patterns found that connect with theories.

Ethnography Study

The ethnography differs from a case study. The case study studies a person, program, or event while ethnography studies an entire group that shares a common culture (Leedy & Ormrod, 2001). Creswell (2003) defines “ethnographies, in which the researcher studies an intact cultural group in a natural setting over a prolonged period of time by collecting, primarily, observational data” (p. 14). The focus is on everyday behaviors to identify norms, beliefs, social structures, and other factors. Ethnography studies usually try to understand the changes in the group’s culture over time. As a result, findings may be limited to generalization in other topics or theories.

In the ethnography methodology, the researcher must become immersed in the daily lives of the participants in order to observe their behavior then interpret the culture or social group and systems (Creswell, 1998). The initial step in the ethnography process is to gain access to a site. Second, the researcher must establish rapport with the participants and build trust. Third, the researcher starts using the big net approach by intermingling with everyone in order to identify the key informants in the culture (Leedy & Ormrod, 2001). The data is collected from participant observations and from interviewing several key informants. If the interviews are lengthy, the researcher gathers documentation by using audiotapes or videotapes media. The aspects included in ethnography are: the justification for the study, the description of the group and method of study, the evidence to support the researcher’s claims, and the findings to the research question. The report must provide evidence of the group’s shared culture that developed over time.

Grounded Theory Study

Creswell (2003) defines grounded theory research as the “researcher attempts to derive a general, abstract theory of a process, action, or interaction grounded in the views of participants in a study” (p. 14). Leedy and Ormrod (2001) further clarifies that grounded theory research begins with data that develops into a theory. The term *grounded*

provides the context of this method while the research requires that the theory must emerge from the data collected in the field rather than taken from the research literature (Leedy & Ormrod, 2001). Grounded theory has also been used primarily in the sociology discipline because this method examines people's actions and interactions.

Grounded theory research is the process of collecting data, analyzing the data, and repeating the process, which is the format called constant comparative method. The data can be obtained from several sources such as interviewing participants or witnesses, reviewing historical videotapes or records, observations while on-site. Creswell (1998) concurs with Leedy and Ormrod's (2001) standard format on how to analyze data in a grounded theory research that includes open coding, axial coding, selective coding, and developing a theory. Finally, a grounded theory report incorporates five aspects: describing the research question, literature review, describing the methodology, data analysis explaining the theory, and discussing the implications (Leedy & Ormrod, 2001).

Phenomenological Study

The purpose of this study is "to understand an experience from the participants' point of view" (Leedy & Ormrod, 2001, p. 157). The focus is on the participant's perceptions of the event or situation and the study tries to answer the question of the experience. Creswell (1998) points out that the essence of this study is the search for "the central underlying meaning of the experience and emphasize the *intentionality of consciousness* where experiences contain both the outward appearance and inward consciousness based on the memory, image, and meaning" (p. 52). The difficulty of this study is that the researcher usually has some connection, experience, or stake in the situation so *bracketing* (setting aside all prejudgments) is required. The method for a phenomenological study is similar to that of grounded theory because interviews are conducted.

The method of collecting data is through lengthy (1-2 hours) interviews in order to understand and interpret a participant's perception on the meaning of an event. Creswell (1998) suggests the procedural format is writing the research questions that explore the meaning of the experience, conducting the interviews, analyzing the data to find the *clusters of meanings*, and ending with a report that furthers the readers understanding of the essential structure of the experience. The study collects data that leads to identifying common themes in people's perceptions of their experiences.

Content Analysis Study

Leedy and Ormrod (2001) define this method as "a detailed and systematic examination of the contents of a particular body of materials for the purpose of identifying patterns, themes, or biases" (p. 155). Content analysis review *forms of human communication* including books, newspapers, and films as well as other forms in order to identify patterns, themes, or biases. The method is designed to identify specific characteristics from the content in the human communications. The researcher is exploring verbal, visual, behavioral patterns, themes, or biases.

The procedural process for the content analysis study is designed to achieve the highest objective analysis possible and involves identifying the body of material to be studied and defining the characteristics or qualities to be examined (Leedy & Ormrod, 2001). The collection of data is a two-step process. First, the researcher must analyze the materials and put them in a frequency table as each characteristic or quality is mentioned. Second, the researcher must conduct a statistical analysis so that the results are reported in a quantitative format. The research report has five sections: the description of the materials studied, the characteristics and qualities studied, a description of the methodology, the statistical analysis showing the frequency table, and drawing conclusions about the patterns, themes, or biases found in the human communications and data collection.

MIXED METHODS APPROACH

Tashakkori and Teddlie (2003) discussed the mixed methods approach to research, which emerged in the mid-to-late 1900s (Tashakkori & Teddlie). Johnson and Onwuegbuzie (2004) hoped that the mixed methods approach to research provided researchers with an alternative to believing that the quantitative and qualitative research approaches are incompatible and, in turn, their associated methods "cannot and should not be mixed" (p. 14). With the

mixed methods approach to research, researchers incorporate methods of collecting or analyzing data from the quantitative and qualitative research approaches in a single research study (Creswell, 2003; Johnson & Onwuegbuzie; Tashakkori & Teddlie). That is, researchers collect or analyze not only numerical data, which is customary for quantitative research, but also narrative data, which is the norm for qualitative research in order to address the research question(s) defined for a particular research study. As an example, in order to collect a mixture of data, researchers might distribute a survey that contains closed-ended questions to collect the numerical, or quantitative, data and conduct an interview using open-ended questions to collect the narrative, or qualitative, data.

The mixed methods approach to research is an extension of rather than a replacement for the quantitative and qualitative approaches to research, as the latter two research approaches will continue to be useful and important (Johnson & Onwuegbuzie, 2004). The goal for researchers using the mixed methods approach to research is to draw from the strengths and minimize the weaknesses of the quantitative and qualitative research approaches (Johnson & Onwuegbuzie). Of course, the strengths and weaknesses associated with the various research approaches are not absolute but rather relative to the context and the manner in which researchers aspire to address the phenomenon under study. For example, if the researcher purports to provide in-depth insight into a phenomenon, the researcher might view selecting a small but informative sample, which is typical of qualitative research. The researcher might use inferential statistics to quantify the results, which is typical of quantitative research, as strengths worthy of combining into a single research study.

By having the ability to design research studies that combine data collection or data analysis methods from the quantitative and qualitative research approaches, researchers are now able to test and build theories. Researchers are also able to employ deductive and inductive analysis in the same research study. The mixed methods approach to research provides researchers with the ability to design a single research study that answers questions about both the complex nature of phenomenon from the participants' point of view and the relationship between measurable variables. Proponents of the mixed methods approach to research advocate doing 'what works' within the precepts of research to investigate, to predict, to explore, to describe, to understand the phenomenon (Carr, 1994; Creswell, 2003; Johnson & Onwuegbuzie, 2004; Mingers, 2001; Sale, Lohfeld, & Brazil, 2002; Tashakkori & Teddlie, 2003). That is, in relation to the mixed methods approach to research, pragmatic assumptions govern claims about what is knowledge (Creswell; Johnson & Onwuegbuzie; Tashakkori & Teddlie, 1998). The fact that the quantitative and the qualitative research approaches are not only compatible but also complimentary underpins calls for additional research studies that use the mixed methods research approach (Carr; Johnson & Onwuegbuzie; Mingers; Sale, Lohfeld, & Brazil; Tashakkori & Teddlie).

CONCLUSION

Quantitative and qualitative research methods investigate and explore the different claims to knowledge and both methods are designed to address a specific type of research question. While the quantitative method provides an objective measure of reality, the qualitative method allows the researcher to explore and better understand the complexity of a phenomenon. This paper presented a clear statement of what constitutes quantitative and qualitative research designs and summarized techniques used to conduct studies for both research approaches. This paper also presented statements of what constitutes the mixed methods approach when conducting research. Although each approach seeks to validate sensory knowledge as truth, neither is absolute in its form.

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