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Research Article

Scope of Quantitative Research under Faculty of Education

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Abstract

Present research work deals with the details of quantitative research. It shows a deep and detail explanation and inclusion of scholarly definitions and concluding ideas in the introduction section. Moreover, the next part deals with its characteristics, objectives of the methodology. The study further reveals quantitative methods can be categorized into survey research, co relational research, experimental research and causal-comparative research. It involves the utilization and analysis of numerical data using specific statistical techniques to answer questions like whom, how much, what, where, when, and how. It also describes the methods of explaining an issue or phenomenon through gathering data in numerical form. This research work concludes that quantitative research has got high validity and its scope is increasing at present.

Keywords: Quantitative research, computational, survey, variable

Introduction

Quantitative research is defined as a systematic investigation of phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques. Quantitative research collects information from existing and potential customers using sampling methods and sending out online collects surveys, online polls, questionnaires, etc., the results of which can be depicted in the form of numerical. After careful understanding of these, numbers to predict the future of a product or service and make changes accordingly.

An example of quantitative research is the survey conducted to understand the amount of time a doctor takes to tend to a patient when the patient walks into the hospital. A patient satisfaction survey template can be administered to ask questions like how much time did a doctor take to see a patient, how often does a patient walk into a hospital, and other such questions. Similarly, Balnaves & Caputi (2011) defines quantitative research as, "a systematic and unbiased way of solving a problem (by answering questions or supporting hypotheses) through generating verifiable data.'

Quantitative research is mostly conducted in the social sciences using the statistical methods used above to collect quantitative data from the research study. In this research method, researchers and statisticians deploy mathematical frameworks and theories that pertain to the quantity under question. For quantitative research Creswell, 2014, p.32 views;

> Quantitative research is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion. Like qualitative researchers, those who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings.

In conclusion, quantitative research templates are objective, elaborative, and many times, even investigational. The results achieved from this research method are logical, statistical, and unbiased. Data collection happened using a structured method and conducted on larger samples that represent the entire population.

Characteristics of Quantitative research

Structured tools: Structured tools such as surveys, polls, or questionnaires are used to gather quantitative data. Using such structure methods helps in collecting in-depth and actionable data from the survey respondents.

Sample size: Quantitative research is conducted on a significant sample size that represents the target market. Appropriate sampling methods have to be used when deriving the sample to fortify the research objective

Close-ended questions: Closed-ended questions are created per the objective of the research. These questions help collect quantitative data and hence, are extensively used in quantitative research.

Prior studies: Various factors related to the research topic are studied before collecting feedback from respondents.

Quantitative data: Usually, quantitative data is represented by tables, charts, graphs, or any other non-numerical form. This makes it easy to understand the data that has been collected as well as prove the validity of the market research.

Generalization of results: Results of this research method can be generalized to an entire population to take appropriate actions for improvement.

Objectives

The objectives of the present study is to:

- explain the meaning and importance of quantitative research
- find out the scope of quantitative research .
- suggest some characteristics of the quantitative and to explain its types.

Methodology

This paper is prepared out of secondary sources. Here secondary data in our research is collected through internet, journals, research paper published in the past. I have collected various books, newspapers, journals some research articles and after detail study, this present work is prepared. I also collected data from various webs and internet too. So far, here the researcher has tried to explain what is quantitative research, its types, its characteristics.

Results and Discussion

Researchers use this quantitative research method to correlate two or more variables using mathematical analysis methods. Patterns, relationships, and trends between variables are concluded, as they exist in their original set up. The impact of one of these variables on the other is observed along with how it changes the relationship between the two variables. Researchers tend to manipulate one of the variables to attain the desired results.

Types of quantitative research

According to Sukamolson (2007) “there are several types of quantitative research. For instance, it can be classified as

(1) Survey research,

(2) Correlational research,

(3) Experimental research and

(4) Causal-comparative research”

In this assignment, the researcher explains each of the type of research as follows:

Survey research

Survey research according to Sukamolson, (2007) encompasses the use of scientific sampling method with a designed questionnaire to measure a given population's characteristics through the utilization of statistical methods. It provides answers like: How many women can take a bullet for their husband? More succinctly Sukamolson, (2007) further describe survey as a form of quantitative research that is concerned with 'sampling questionnaire, questionnaire design, questionnaire administration' for the sake of gathering information from the group/population under study, and then make analysis to order to better understand their behavior/characteristics. Furthermore, Kerlinger (1973) sees survey research as social scientific research that focuses on people, the vital facts about people, and their beliefs, opinions, attitudes, motivations and behavior. In addition, Kraemer (1991) outline three basic tenets in survey research, namely, survey is used to describe quantitatively a sectional aspect of a given populations which involves studying the relationship, in survey research method, data are obtained from people , and lastly, survey sample a part of population which is later used to generalize the whole population, i.e a section of a population is sampled to represent the whole population characteristics, viewpoint as well as opinion as the case maybe. According to Merriam-Webster Dictionary survey is derived from Anglo-French word 'surveer' which means to look over. Further, according to the dictionary, survey means (a) to examine as to condition, situation, or value-appraise; (b) to query (someone) in order to collect data for the analysis of some aspect of a group or area; (c) to determine and delineate the form, extent, and position of (as a tract of land) by taking linear and angular measurements and by applying the principles of geometry and trigonometry; (d) to view or consider comprehensively; and (e) to inspect, scrutinize.

Correlational research

A quantitative methodology used to determine whether, and to what degree, a relationship exists between two or more variables within a population (or a sample). The degree of relationships is expressed by correlation coefficients. Coefficients range from +1.00 to -1.00. Higher correlations (coefficients closer to +1.00 or -1.00) indicate stronger relationships. Positive correlations indicate that as the values associated with one variable go up, so do the values associated with the other. e.g., higher grades are associated with higher? Negative correlations indicate that as the values associated with one variable go up, the values associated with the other go down e.g., higher grades are associated with lower??? Buttressing on this, Leedy & Ormrod (2010) remark that correlation method of research deals with the creating relationship amid two or more variables in the same

population. "The first type of correlational design, explanatory design, is conducted when researchers want to explore the extents to which two or more variables co-vary, that is, where changes in one variable are reflected in changes in the other (Creswell, 2008, p. 358). The second type of correlational design, prediction design, is used by researchers when the purpose of the study is to predict certain outcomes in one variable from another variable that serves as the predictor.

Experimental research

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, 2001). 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. Whereas, 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. The factorial design focuses on two or more categories with the independent variables as compared to the dependent variable (Vogt, 1999). Key, (1997) describes experimental research as a form of research whereby a researcher takes control and maintains the basic elements that might affect the result of an experiment, by so doing; the researcher predicts the outcome of an experiment. While experimental design is the synopsis that guides a researcher while testing his hypothesis in order to reach a tangible conclusion on the relationship concerning an independent variable and a dependent variable. Furthermore, Key, (1997) outline the steps involved in experimental research as follows:

i. Selecting a sample subjects

ii. Grouping or pairing of subject matter

iii. Selecting and constructing as well as validating the instruments that will be used to measure the outcomes

iv. Conducting a pilot study

Determining place, time and duration of the experiment

Experiment deals with the process of supporting, rejecting, or validating a hypothesis in order to get insight into the cause and effect of something when certain factors are being manipulated. For example, someone may carry out a basic experiment to understand the existence of gravity while

others basically scientists carry out experiment for years depending on the subject matter to be experimented. Furthermore, Ader, (2008) states that there are certain things a researcher should ruminate while embarking on an experimental research, that is, considering the suitable way of operationalizıng the variables to be measured as well as the appropriate statistical method to be employed to answer the hypothesis or research questions, putting into consideration, the expected outcome of the study as well as how to analyze such outcome, the limitations involve in the study, such as the obtainable participants and their relevance and suitability in the representation of the target population of the study.

Causal-Comparative or Ex Post Facto research

Ex post facto implies "from after the fact" (Gay, 1976). In simple terms, in ex-post facto research, the researcher investigates a problem by studying the variables in retrospect. It is research in which the dependent variable is immediately observable and now your main concern is to find out the antecedents that gave rise to this consequence. In other words, a causal-comparative study is a form of study that tries to identify and determine the cause and effect of the relationship between two or more groups. The causal-comparative study is a study in which the researcher attempts to determine the cause, or reason, for pre-existing differences in groups of individuals. Differences and similarities between causal comparative and correlational studies:

• The causal-comparative study looks at differences between groups while correlational study looks for relationships of variables within a single group.

• Causal-comparative and correlational studies are similar in that both used to examine relationships among variables.

• Causal-comparative includes categorical independent and or dependent variable but the correlational study only includes quantitative variables.

• Causal-comparative research provides better evidence of cause and effect relationships than correlational research.

• Like correlational research, causal-comparative research is sometimes treated as a type of descriptive research since it too describes conditions that already exist.

Types of Causal-Comparative Research Designs

There are two types of causal-comparative research designs. They are retrospective causal-comparative research and prospective causal-comparative research. Retrospective causal comparative research necessitates that a researcher starts investigating a precise

problem when the effects have previously happened and the researcher endeavors to determine if one variable might have prejudiced another variable. Prospective causal-comparative research happens once a researcher starts a study beginning with the causes and is resolute to evaluate the effects of a situation. By far, retrospective causal-comparative research designs are considerably more common than prospective causal-comparative designs (Gay et al., 2006). However, people mistakenly consider that causal-comparative research is in some way superior to correlational research. This may be related to people's understanding that correlational research does not permit researchers to determine what variable causes another variable. Rather, correlational research allows researchers to determine the relationship or association between two or more variables. Regardless, it is imperative to recognize that neither correlational nor causal-comparative research produce experimental data (Gay et al., 2006). Instead, both research methods are well thought out to be non-experimental methods of data collection (Lodico et al., 2006).

Scopes and significance

Quantitative methods are ideal for finding out when and where, who and what and any relationships and patterns between them. They also allow broad study with large sample sizes, which makes for greater accuracy when extrapolating, and can help to improve accuracy of the general result. If you have the choice of surveying 5,000 people or 50,000 people, it's not much more work to get the extra surveys done by outsourcing the research. The greater the survey pool of participants, the more general and representative the results will turn out to be. Quantitative research allows you to analyze your data in a highly objective manner, as quantitative research takes into account very few variables and huge amounts of data. Assuming your data collection methods are acceptable and standards are met, using quantitative data analysis can allow your research to be replicated and analyzed to arrive at the same results. The scientific method espouses repeatable results, and this can improve the validity of your claims from your evidence. Quantitative research can be quite math-heavy, so taking a course in using a computer program for statistical analysis like Microsoft Excel to do the heavy lifting for you is highly advisable. Quantitative Data Analysis offers another benefit that generally isn't found with other methods of experimentation. It helps your results be more accurate, as it is very difficult to add personal bias to numbers obtained when the correct data gathering procedures have been followed. Avoiding personal bias and confirmation bias in the case of analysis means that your data will be much more accurate, as bias happens even when you try to make sure that no bias affects the results. By using purely mathematical analysis on your data, your personal opinion doesn't matter; and the data remains truthful, as it cannot share your opinion.

Conclusion

The Paper explicated the quantitative methodology. The study establishes that quantitative research deal with quantifying and analyzing variables in order to get results. It involves the utilization and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when, how many, and how. It is also described as the methods of explaining an issue or phenomenon through gathering data in numerical form. The study further reveals that quantitative methods can be categorized into; survey research, correlational research, experimental research and causal-comparative research. The study established as remarked by Gelo, et-al. (2008, p.) that "Quantitative and qualitative research approaches clearly differ in terms of how data are collected and analyzed. Quantitative research requires the reduction of phenomena to numerical values in order to carry out the statistical analysis. By contrast, qualitative research involves the collection of data in a non-numerical form, i.e. texts, pictures, videos, etc.

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