

QUALITATIVE RESEARCH METHOD AND DATA ANALYSIS TECHNIQUES

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Abstract This research paper provides the details about qualitative research. It deals with different ways of performing qualitative researches. Also differentiates between quantitative and qualitative researches. Various ways of hypotheses testing's and data interpretations are provided in details. So this paper is a brief overview about quantitative research methods and data analysis techniques.

Keyword: Research, Qualitative Research, Quantitative Research, Data Analysis, Hypothesis

INTRODUCTION

In this module you will be exposed to the various methods in which quantitative and qualitative data could be analyzed in social sciences. Further, you will also be guided the ways in which the analyzed data could be interpreted so as to answer the research questions. You will also be introduced to most common techniques used in the quantitative and qualitative research to deal with raw data and their underlying assumptions and some of the necessary cautions one has to exercise during analyses and interpretation of the results.

OBJECTIVES

At the end of this module, you will be in a position to :

- Understand the different methods of data analyses in quantitative and qualitative research;
- Identify the most appropriate technique for analyzing data in different research contexts;
- appreciate the need for adhering to certain rules of the game while interpreting the meanings;

What is Analysis and Interpretation of Data?

In most simple terms the process of data processing and of converting raw data into meaningful statements is called analysis and interpretation of data. In other words it is the process wherein the researcher deals with the raw data to uncover the meanings they contain in order to arrive at solutions for the research problem posed. Generally a researcher presupposes the kinds of analyses the data under study would lend itself for and accordingly prepares the format in which data need to be collected.

Analysis and Interpretation of Quantitative Data

Generally there are certain major activities involved in the analysis of the data in quantitative methods. They are: **Data Preparation** – coding, editing and checking

Counting- recording the frequency of occurrence of certain; responses which can be done manually or elect;

Grouping/Classifying – ordering of items depending on similarities or differences so as to distribute data in tabular or graphic form;

Relating – cross tabulation and statistical tests to explain relationships;

Predicting – extrapolating trends identified into the future through appropriate statistical techniques;

Statistical testing – tests of significance, correlation, association, inferences could be done to test the hypotheses.

The analyses can be done manually or mechanically. Mechanical analyses are preferred when the sample is large. Even in manual analyses use of calculators are most common.

How Should One Present Data in Quantitative Research?

There are various ways in which data can be presented. Data can be presented either in the form of distribution or tables. In distribution, data are organized and arranged in the required format. The most common distribution found in social sciences is the frequency distribution which displays the frequency of occurrence of certain categories in a range of scale. Obviously this requires that a scale has

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to be developed in advance that can arrange the scores in descending order. This process is also called the rank order distribution of an array of scores. The next step in distribution is the tallying the raw scores and then converting the tallies into frequencies. This would ultimately result in a frequency distribution which would indicate the sample size, range of scores, size of class interval in case of grouped data, and the number of scores in each class interval.

Tables are used for presenting large scale data. Tables enable the researcher to see the trends and patterns of relationships between various elements in the research. The structure of the table should essentially indicate a title, a heading the body of the table (with rows and cells), margins (sums of the columns and cells) and footnotes. Tables can be presented in different types depending on the research question. It can be a univariate, bivariate or multivariate. Sometimes tables can also be in the form of frequency distribution or cumulative frequency distributions.

There are certain rules one needs to follow while presenting data. They are clarity simplicity, order of variable appearance, accuracy and objectivity. Apart from presenting data in the table form it can also be presented visually by using graphs. Different types of graphs are used in social science research. The most common ones are the frequency polygon, the histogram, the bar graph, the Ogive, profiles, scanergram, the normal curve, the pie chart, population pyramid etc.. There are also canographs which present values of variables in a map with relevant symbols or pictograph when the amounts of certain products or population or occurrence of incidents are displayed.

How Should One Present Qualitative Data?

A variety of methods are employed in qualitative research to present data. Tables and graphs are also used in qualitative research. However, one should note that the structure of presentation does not adhere to any set rules and procedures in qualitative research. Some of the common forms are the matrices, figures and charts. Matrices generally contain a title, heading, cells and other forms of information seen in any table. But matrices are only summaries presented in verbal form, quotes, summarized text, extracts from notes, memos, standardized responses and in general data integrated around a point or research theme that makes sense. Further matrix can be a checklist matrix, time ordered matrix, role ordered matrix, conceptually clustered matrix, site dynamic matrix etc.

Analyses and Interpretation of Data in Qualitative Research Methods

As we aware that in qualitative research the data is in qualitative form which most often becomes difficult to quantify the method of analysis hence has to be different from the ones followed in quantitative research. Thus in qualitative analysis there is minimum use of quantitative measurement, standardization and mathematical formulae.

In traditional qualitative research analysis is part of the data collection and evaluation. While further data are collected, analysis continues and evaluation and interpretation follow and the circular process is repeated until all units have been studied and the research issue is saturated. Thus, the researcher searches for certain patterns of data in the form of recurrent behaviors, events etc.

Analysis involves a number of elements all related in a process that allows the establishment of conclusions. So far as qualitative research is concerned there has been certain agreements regarding analysis :

If is cyclic and continuous process with data reduction, data organization and interpretation; long and diverse process which covers the time of actual face to face contact with the respondents as well as the time between the sessions; *collection of data and al l alysis lakes place simulwleossly* with working on the notes collected previously refining correcting and defining concepts identifying the gaps and integrating already collected and analysed data for the purpose of drawing final conclusions.

Three phases are, identified in the cyclical process of analysis. They are

Data Reduction: is the process of manipulating, integrating, transforming and highlighting the data through summarizing, coding and categorizing. Reduction involves careful reading of the recorded material, identification of the main theme of the studied process, behaviour etc.. Although the rules of data reduction vary from case to case, nevertheless they are essentially governed by the research objective and the theoretical assumptions of the framework.

Data reduction can also occur during participant observation or in-depth interviews.

Data Organization: categorizing or collapsing information in more specific terms through the process of assembling information around certain themes and key points. The most common form of presentation used is the text, Sometimes matrices, charts and graphs are also used.

Data Interpretation: refers to arriving at decisions and conclusions related to the research question. The researcher may identify patterns and regularities, trends and explanations.

There are certain approved ways of handling data in qualitative research. They are neither uniform nor integrated into a few guiding models as qualitative research is based on notion of subjectivity, which allows personal expression and individuality, not only in approaching data, but also in generating and analyzing data (Sarantakos.1993)

The method employed by researchers varies considerably depending upon the cases being studied. Because of this a model of qualitative analysis has been suggested which includes a process starting from coding, to the development of concepts, and then, with the assistance of memos, to new categories which would ultimately lead to the hypotheses and to grounded theories (Strauss, 1987; 1991)

There are also other set of analysis methods proposed which include use of summary contact sheets; using codes and coding; pattern coding; memoing; site analysis meeting and interim site meeting (Huberman, 1984)

Another method of analysis that is proposed is successive approximation; illustrative methods; analytic comparisons; method of agreement; method of difference; domain analysis; ideal types and cultural analysis (Neuman, 1991). Apart from the above methods of analysis: ideal types research there are some more methods which are used in specific contexts. Some of them are qualitative interviews; analysis after data collection: qualitative observation: case study.

In the absence of standard guidelines to interpret qualitative data, Miles and Huberman (1984) suggest certain tactics for testing validity, objectivity, replicability and for assuring quality of conclusion and to avoid bias. They are counting, noting patterns, assuring plausibility: clustering, thinking metaphorically, splitting variables, factoring, finding intervening variables, building a logical chain of evidence and making conceptual and theoretical coherence.

Computers are also being used in qualitative data analysis. Computers are used as word processing aids to manipulate the text as well as to categorise and to classify. Information, it is also used for analysis of nominal data ('Qualtro', 'The Ethnograph', 'Knosys' PROLOG etc.,).

Interpretative and Narrative Methods

Interpretative method of analysis or interpretive analysis as the name itself suggests interpretation of the data that is being collected for research. Therefore it is also a method of data collection as well as a method of analysis. Interpretative methods are largely used in qualitative researches wherein the data are in qualitative form. Interpretative methods of analysis can be followed whenever the data are collected through:

- Historical review of documents/books/published/unpublished materials;

- Systematic content analysis
- Informant
- Observation and
- Unstructured interviews.

Narrative method of analysis or narrative analysis is most commonly used for analyzing documentary data extracted from written materials relating to people's lives. For instance a documentary of someone's speech may be converted into texts so as to read and interpreted. Herein the narrative analysis attempts to define the cognitive meaning of the text, its internal coherence with reference to codes, syntax, grammar or forms etc,

Two types of approaches are found to be employed in narrative form of analysis while taking assumptions about organizing cognitive meaning of the texts. They are i) the top down approach and the ii) bottom up approach. In the top down approach the investigator begins with a set of rules and principles and accordingly attempts to exhaust the meaning of the text. Education and cognitive psychology make use of this approach.

The bottom up approach derives context-dependent units to produce an infrastructure that explains the tale's effect. Most ethnographic studies use this approach. Researcher can use a dialogue form or interpolation of a cultural phenomenon. Generally this approach relies on personal interviews or documents.

Choice of Statistical and Processing Techniques

The choice of statistical technique in quantitative data analysis essentially depends upon the following:

- Nature of the research question;
- Number of variables;
- Kinds of variables;
- Sample size;
- Research design;
- Kinds of issues hypotheses posted in the study;

Both parametric and non parametric techniques could be adopted considering the above factors. When one is concerned with establishing relationships between and among variables or predicting the trends and parents non-parametric statistical techniques such as correlation regression factor analysis are useful. Further for testing significance of relationships t-test. ANOVA, ANACOVA etc...are useful.

Theory of Testing of Hypotheses: The function of the hypothesis is to state a specific relationship between phenomena in such a way that this relationship can be empirically tested. This means that any hypothesis should

empirically demonstrate the probability. In order to this it is necessary to design the research in such a way that logic will either accept or reject the hypothesis base on the resulting data.

The theoretical base for testing hypothesis is grounded in the basic design of logical proof formulated by John Stuart Mill in early 1990s. This has remained the foundations of testing hypotheses even today although with certain refinements. There are two methods in this. The method of agreement and the negative canon of agreement assumes that when two or more cases or a given phenomenon have one and only one condition in common then that condition may be regarded as the cause (or effect) of the phenomenon. The negative canon of agreement on the other hand assumes that when condition non-C is found to be associated with observation non-Z we may assert causal relationship between C and Z.

Based on the positive and negative canons proposed by Stuart Mill the classical design of proof by the method of difference has evolved which uses two series of matched groups only one of which is exposed to the experimental stimulus. This assumes that if there are two or more cases and in one of them observation Z can be made while in the other it cannot: and if factor c occurs, when that there is a causal relationship between C and Z. There are certain problems of proof in this design. They are –i) recognizing and controlling the variables which are of importance in the research; ii) the causal relationship may not be clear; iii) the element of time may confuse experimental results in social science; v) classical design is stated in simplistic terms. A deviation from the classical design of proof is the ‘before and after’ or successive experimental design of proof which is also frequently used in social sciences.

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