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RESEARCH METHODOLOGY
UNIT- III
TOPIC: QUANTITATIVE DATA ANALYSIS

By:
Dr. Abhay Vikram Singh
Assistant Professor
Dept. of Gandhian and Peace Studies
Mahatma Gandhi Central University
Motihari (Bihar)

Overview

- What is Data Analysis?
- Meaning of Data Analysis
- Importance of Data Analysis
- Issues in data analysis
- Types of Data Analysis
- Methods of Data Analysis
- conclusion

What is Data Analysis?

- Data analysis is the most crucial part of any research. Data analysis summarizes collected data. It involves the elucidation of data through the use of analytical and logical reasoning to determine patterns, relationships or trends.

- The purpose of data analysis is to extract useful information from data and taking the decision based upon the data analysis. There are many different data analysis methods, depending on the type of research.

Meaning of Data Analysis

- Data analysis is a process of inspecting, cleansing, transforming and modeling data.

- It is a method in which data is collected and organized so that one can derive helpful information from it. In other words , the main purpose of data analysis is to look at what the data is trying to tell us.

- It is a process for obtaining raw data and converting it into information useful for decision-making by users.

Importance of Data Analysis

- Data analysis is very helpful in breaking a macro problem into micro parts . It arranges , explains , and introduces the data into useful information that provides context for the data.

- It acts like a filter when it comes to acquiring meaningful insights out of huge data set.

- Data analysis helps in keeping human unfairness away from the research conclusion with the help of proper statistical treatment.

- Data analysis helps in structuring the findings from different sources of data.

Issues in data analysis

There are a number of issues that researchers should be cognizant of with respect to data analysis. These include:

- Having the necessary skills to analyze
- Concurrently selecting data collection methods and appropriate analysis
- Drawing unbiased inference
- Inappropriate subgroup analysis
- Following acceptable norms for disciplines
- Training of staff conducting analysis
- Reliability and Validity

Types of Data Analysis

The major types of data analysis are:

      (i) Text Analysis

      (ii) Statistical Analysis

      (iii) Diagnostic Analysis

      (iv) Predictive Analysis

      (v) Prescriptive Analysis

Methods of Data Analysis

- There are two methods that a researcher can pursue:

(i) **Qualitative Research** revolves around describing characteristics. It does not use numbers. A good way to remember qualitative research is to think of quality.

(ii) **Quantitative Research** is the opposite of qualitative research because its prime focus is numbers. Quantitative research is all about quantity.

Analysis of Quantitative Data

There are two types of analysis:

(i) **Descriptive Analysis :** Descriptive analysis are used to describe the basic features of the data in a study and includes descriptive statistics such as range, minimum, maximum, and frequency.

- With descriptive analysis you are simply describing what is or what the data shows. It also includes measures of central tendency such as mean, median, mode, and standard deviation.

- Descriptive statistics are most helpful when the research is limited to the sample and does not need to be generalized to a larger population.

Common Descriptive Statistics

□ **Range**: The difference between the highest score and lowest score.

□ **Minimum (Min)**: The lowest/smallest score in a data set.

□ **Maximum (Max)**: The highest/largest score in a data set.

□ **Frequency**: The number of times a certain value appears in a set.

□ **Percentage**: used to express how a value or group of respondents within the data relates to a larger group of respondents.

Measures of Central Tendency

☐ A measure of central tendency is a summary statistic that represents the centre point or typical value of a dataset . It may also be called a centre or location of the distribution . These measures include mean, median, and mode.

☐ **Mean**: The average or the sum of the values divided by the number of values.

☐ **Median**: The middle score of data when set in numerical order. To find the middle position, order the scores, count the number of scores, add 1, and divide by 2.

- **Mode**: The most frequently occurring score in a data set.

- **Standard deviation**: When we think about how participants are responding in general (e.g., mean, median, mode), we also need to consider how far apart or close together participants' responses are. To understand more about the nature of the data, you can consider standard deviation.

- A standard deviation represents the average amount that a given score deviates from the mean score.

- The standard deviation measure variability and consistency of the sample or population

- (ii) **Inferential analysis: I**nferential analysis allows you to make predictions from that data. With inferential analysis , you take data from samples and make generalizations about the population.

- Inferential analysis uses statistical tests to see whether an observed pattern is due to chance or due to the program or intervention effects.

- Research often uses inferential analysis to determine if there is a relationship between an intervention and an outcome as well as the strength of that relationship.

Conclusion

- Data analysis is perhaps the most important component of research. Weak analysis produces inaccurate results that not only constrain the originality and reliability of the research but also make the findings unusable. It's necessary to choose your data analysis methods carefully to ensure that your findings are perceptive and actionable.