- Objective of the Module:

  Select and explain the methods of data analysis

- Knowledge Analysis:

Prerequisites:	Essential Questions:
A student has Knowledge of : 1. Concept of research and characteristics of research 2. Types and steps of research	1. What is data analysis and why it is essential? 2. How to analyze the qualitative and quantitative data?

- Instruction (Referencing):

Content	Mode of Transaction
1. Analysis of qualitative data based on various tools 2. Analysis of quantitative data and its presentation with tables, graphs etc. importance of quantitative data analysis 3. Statistical tools of data analysis- measures of central tendency, dispersion, relative position etc.	1. Lecture with Presentation 2. Reading and reflective thinking 3. Assignment & Project

INTRODUCTION:

The Data analysis involves several activities like coding –decoding of data, classification, organization, employing different tests on data, presentation of data etc. The data analysis activities changes according to the qualitative and quantitative nature of data.

The following are the main purposes of data analysis:

(i) Description: It involves the description of variables, constructs, observations to meet the objectives of the research problem. a set of activities that are as essential first step in the development of most fields. A researcher must be able to identify a topic about which much was not known; he must be able to convince others about its importance and must be able to collect data.

(ii) Construction of Measurement Scale: The researcher should construct a measurement scale. All numbers generated by measuring instruments can be placed into one of four categories:

(iii) Generating empirical relationships: Another purpose of analysis of data is identification of regularities and relationships among data.

(iv) Explanation and prediction: Generally knowledge and research are equated with the identification of causal relationships and all research activities are directed to it.

Present module is comprised of two parts (i) Analysis of qualitative data and (ii) Analysis quantitative data.

Analysis of Qualitative Data:

The qualitative data connotes the data in the form of text, Narrations, symbols and non-numerical forms. The qualitative analysis is mainly descriptive analysis which gives the explanation, conceptualization, theorization of etc. Few of the techniques of the qualitative data analysis are as follows:

1. Typology: This technique involve the classification of data. The classes or types must be very distinctive and broad which can involve large data as possible.
2. Taxonomy: This is an advanced typology which defines the multiple levels of the construct and hierarchy of the different types with their relationship.

3. Analytic Induction: It is the summarization of information according to Inductive logic which begins with a hypothetical statement (major premise) and then identifies the cases as evidences of major premise, looks the exceptions to hypothesis and revises if found that the statement is not applicable to the all cases.

4. Narrative Analysis: This technique involves the analysis of narrations may be given in the text form or may be direct speech of the individuals. The interpretation of the narration in the context of situation and conceptualization from the narrations is major part of the narrative analysis.

5. Discourse analysis: This technique involves the analysis of content and process of analysis of communication and interaction to find patterns, categories, domains etc.

6. Event Analysis/Microanalysis: This technique involves the analysis of each micro step or phase of any event, phenomenon or process from its beginning point to the end to give explanations of structure and functioning of each component involved in the event/process etc.

Analysis of Quantitative Data:

The quantitative data connotes the data in the numerical forms. The qualitative analysis is mainly statistical analysis which have wide range of parametric and non-parametric tests. Two types of statistics are supposed in quantitative data analysis as :

1. Descriptive Statistics

2. Inferential Statistics

The descriptive statistics may be on any of the following forms:

A. Measures of Central Tendency: Central tendency describes how the data is crowded and how the elements of data are close to each other. The measures of central tendency mode, median and mean. The mode shows the number having highest frequency in the data set, median shows the number having relatively middle position in the data set and mean is mathematical average of entire data set. Researcher should use appropriate parameter according to the nature of data.

B. Measures of Variability: The variability shows the distribution of the data and how the elements of data are separated from each other. The measures of variation /deviation are range, mean deviation, quartile deviation and standard deviation. Range shows the upper and lower limit of the data set, quartile deviation is associated with median and shows the variation of the data in four quartiles of the data set. Mean deviation and Standard deviation are associated with mean. They show average of variation in entire data set. Mean deviation is expressed as absolute value and standard deviation formula uses the square values of the elements of entire data set.

C. Measures of Relative Position: Standard scores (Z or T scores), percentiles and percentile ranks are the measures of relative position of particular data within the entire data set.

D. Measures of Relationship: Measures of relationship shows how the two variables are associated with each other and what the degree of their relation is? Themeasures are Co-efficient of Correlation, partial correlation and multiple correlations.

The inferential statistics has very wide range of different statistical tests. Few of them frequently used are as follows:

Chi-square test

Chi-square test compares the frequency count of observations with expected count of observations. The test may applied on the data of one independent variable or may be used to compare distribution of multiple independent variables.

It is type of non-parametric test.

T-test

The *t*-test is employed to compare the two data set of independent variables. It is ratio of the mean difference of two data set and standard error. The calculated t value is compared with theoretical t value at particular degrees of freedom.

ANOVA (Analysis of Variance)

ANOVA is to compare more than two groups of data set or variables. It is the ratio of error between the groups and within the groups. The ratio is called F value. Calculated F value is compared with theoretical F value to find out significant differences among the groups.

Regression Analysis:

Regression analysis is used to find out the relations among variables and the direction of relationship also.

Two important criterions for testing are:

1. Degrees of Freedom: The degrees of freedom shows the number of independent observations. Each statistical test has different formula to calculate degrees of freedom.
2. Level of Significance (p value): Level of significance shows the degree of the accuracy of the results within the boundary of 0- 100%. The concept is based on Normal Probability Curve (NPC) of distribution of the data. Thus, actual 0% and 100% could not be identified. Generally, the level of accuracy must be 95 % or greater (which means p value=>0.05). p value =0.01 means 99% accuracy of the results.

   Theoretical values of Chi square, t –value, F- value etc. at different level of significance and degrees of freedom are given in the books of statistics which are used to compare with calculated valuesw of above mentioned test.

Selecting your statistical test

The important things while selecting statistical tests are

- The level of data (nominal, ordinal, ratio, or interval).
- The number of groups or variables involved in the study
- Nature of the data
- Degrees of Freedom
- Level; of Significance.

Now a day because of computer the analysis of large data is became smooth, easy and more accurate. The different statistical packages for analysis of data belonging various disciplines are available. For example, SPSS (Statistical Package for Social Sciences) is popular for data analysis in the disciplines of social sciences.

SUMMARY:

Qualitative data analysis is significant for the study of problems having their answers in the data in the form texts, symbols, non-numerical forms. There are several techniques for analysis of qualitative data. However, it is not so simple or mechanical.

Quantitative analysis is comprised of descriptive and inferential statistical techniques. Descriptive statistics gives the knowledge of summarized features of data by using different measures according to nature of data. Inferential statistics is required to derive inference by using statistical tests for examination of hypothesis.