

Scales of Measurement or Levels of Measurement

There are four basic ways for quantifying a variable. They are also called levels of measurement and are commonly referred to :

1. Nominal Scale : The nominal scale is the least precise or crude among the four basic scales of measurement. It simply implies the classification of an item into two or more categories without the classification of an item into two or more categories without any extent or magnitude. There is no particular order assigned to them. The frequency of numbers are used to give a name to something that may be used for determining per cent, mode. For example boys and girls; pass and fail; rural and urban, etc., yields discrete data.

The classroom observation, the measurement is done at nominal scale. The teaching and instruction are organized considering the mode of the students, because a teacher cannot pace with each and every student in his teaching and learning process.

2. Ordinal Scale : The ordinal scale is precise than the nominal scale. It allows the teacher to assign values by placing or arranging the observation in relative rank order. No value is assigned to the distance between positions of ranking. The scale assigns observation to categories by number and arranges them in a logical order. It does not require the relationship of equivalence but also requires one observation to be greater than the other.

This scale is used frequently in the schools for prize distribution and to provide the motivation by the technique of competition. In asking the questions, teacher considers the place of student in the class.

3. Equal-Interval Scale : The equal-interval scale is more precise and refined scale than nominal and ordinal scale. This scale has all the characteristics and relationship of the ordinal scale, besides this distances between any two numbers on the scale are known. The zero point and the unit of measurement used on the scale are arbitrary or assumed. A linear relationship is established in the equal-interval scale continuous data.

The equal-interval scale has the greater use in teaching-learning situation, educational administration, educational guidance and counselling and educational research. The effectiveness to any instructional procedure can be evaluated precisely by collecting the data on this scale. The measurement in education is usually done on equal-interval scale. The dependable inferences are drawn in educational research by collecting evidences on equal-interval scale.

Classification of Tools of Research with Regard to the Levels of Measurements

Scale of Measurement	Tools of Research	Statistics
1. Nominal Scale	Questionnaire Interview Schedule Observation	Mode, Frequency percentage Simple statistics χ^2 - test and 'C'
2. Ordinal Scale	Scale Observation Rank Scale	Median, Spearman's rank correlation χ^2 - test Median test etc.
3. Equal-interval Scale	Psychological and educational tests Observation scale	Mean, S.D. Pearson's correlation 't' test and 'F' test etc.
4. Ratio Scale	Physical Measurement	Arithmetic mean Pearson's correlation Mathematics is used

4. Ratio Scale : The ratio scale is the most refined among the four basic scales. It has all the characteristics, of equal-interval scale. In addition to that, It has an absolute zero point representing complete absence of the property being measured. It is used in physical sciences and less frequently in behavioural sciences. In school, it is used in maintaining the cumulative records of the students. The cognitive and affective objectives can be assessed by using earlier scales of measurement. The ratio scale may be used for measuring the psychomotor objectives.

The measurement on various scales is done by using different types of measuring instruments. The questionnaire and observation yield ordinal data, educational and psychological test provide scores or marks and physical measurement yields the data ratio scale. The characteristics of a good measuring instrument have been described here.

Methods of Measurement

The measurement of the individual characteristics has a great diversity both of methods and of content area. The variation of method may be due