

Chapter **I**

Measurement And Evaluation In Education

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From the very day of inception man is very much interested to know the things around him and himself. He is curious to discover the nature and rules governing the nature. To satisfy his needs he started to distinguish among objects like small and big, light and heavy, tall and dwarf etc. Through this process he started counting which gave birth to numbers. In this process of discovery he started measuring different objects. Gradually the process of quantification became an essential part of human life.

Now a days measurement is an important feature of our daily life. From birth till death every aspect of our daily life is touched by measurement in one form or other. When a baby is born the physician keeps the record of the time of birth. His weight and height are measured. As he grows, every aspect of his life

became concerned to measurement. Starting from simple house-hold works of a house wife till the space research every where the knowledge of measurement is essential. All this what we have discussed is called physical measurement. But educational measurement is more complex than the physical measurement. Because educational measurement involves the mental processes of individual which can only be measured from his behaviour.

In a normal class the instructional decisions are guided by a number of observations. For example a teacher can know the learning difficulties of the students by asking oral questions. On the basis of which he can take remedial measures like total repeat of a chapter or using some learning aids or instructing for more practice to a particular student etc. These decisions are based upon pupils oral responses, performances or from the gesture and posture. All these are teacher's moment to moment observation. Though these observations are informal and unsystematic still it plays an important role in the teaching learning process. Thus the teaching learning process involves a continuous and interrelated series of instructional decisions concerning the ways to enhancing pupil learning. In this particular situation different types of measurement data might be very useful.

WHAT IS MEASUREMENT :

Measurement means quantitative description of data. It is the act or the process of ascertaining the extent or quantity of something. When we assign numbers to express the quantity of an object or trait it is called measurement. Different educationists have defined the word as following.

N.E. Gronlund and R.L. Linn. Measurement is the process of obtaining a numerical description of the degree to which an individual possesses a particular characteristics.

James M. Bardfield. Measurement is the process of assigning symbols to dimensions of phenomena in order to characterise the status of a phenomenon as precisely as possible.

R.H. Lindman. Measurement is assignment of one or a set of numbers to each or a set of persons or objects according to certain established rules. This set of numbers depends upon the nature of the characteristics being measured and upon the type of measuring instrument used.

Thorndike and Hagan. Anything that exists at all exists in some quantity is capable of being measured.

C.V. Good. The comparison of a quantity, (exibited by a particular case) with an appropriate scale for the purpose of determining (within the limits of accuracy imposed by the nature of the sale) the numerical value on the scale that corresponds to the quantity to be measured.

From the analysis of above definitions it may be said that measurement is the process of quantification of some phenomena. It is to assign a number or a set of numbers to one or a set of phenomena. In this process comparison is made of a quantity with an appropriate scale for the purpose of determining the numerical value.

Physical Measurement and Educational Measurement :

Educational measurement is very much subjective and complex than physical measurement. Educational measurement involves mental process of the individual which is abstract and interpreted in terms of behaviour. Physical measurement is complete in itself and the whole amount can be measured. It is absolute and conveys a definite meaning. But educational measurement is not so objective, definite and precise. Educational measurement is done according to some pre-determined standards which may be very much subjective and far from being specific.

We can summarise the difference between physical measurement and Mental Measurement under following headings.

Physical Measurement	Mental Measurement
1. There is an absolute zero point. It is related to a fixed standard.	1. There is no absolute zero point. It is related to some arbitrary standard.
2. There is a definite order.	2. There is a recognisable order.
3. There is fixed measuring units to measure a trait.	3. There is no fixed measuring units to measure a trait.
4. The units of measurement are constant throughout the measurement.	4. The units of measurement varies during the process of measurement.
5. The data obtained can be interpreted directly.	5. The data obtained are converted to standard scores for interpretation.
6. The trait is measured directly.	6. The trait is inferred from the behaviour.
7. The measurement is objective.	7. The measurement may be subjective.
8. There is definite tool to measure a particular variable.	8. There is no definite tool to measure a particular trait or variable.

Physical Measurement	Mental Measurement
9. The data are generally expressed in ratio scales.	9. The data can be expressed in nominal ordinal or internal scales.
10. The measurement is absolute.	10. The measurement is relative.

NATURE OF EDUCATIONAL MEASUREMENT

The nature of educational measurement can be discussed under following headings.

(a) **In educational measurement there is no absolute zero point.** In educational measurement there is no absolute zero point. It is relative to some arbitrary standard. For example a student has secured 'O' in a test of mathematics. It does not mean that he has 'O' knowledge in mathematics. Because he may secured 30 in another test which is easier than the first one. As the zero point is not fixed so we cannot say that a student with a scores of '60' has double the knowledge of a student with a score of '30'.

(b) **The units are not definite in educational measurement.** In educational measurement the units are not definite, so we may not obtain the same value for every person. Because the test vary in their content and difficulty level. Therefore one individual may perform differently on different tests and different individuals may perform differently on one test.

(c) **It conveys a sense of infinity.** It means we cannot measure the whole of an attribute of an individual. Generally the scores obtained from a measurement are observed scores which contains measurement errors. So that true score is infinite and unknown.

(d) **It is a process of assigning symbols.** Measurement is a process of assigning symbols to observations in some meaningful and consistent manner. In measurement generally we compare with certain standard unit or criteria which has an universal acceptability.

(e) **It cannot be measured directly.** In case of educational measurement we cannot measure for attribute directly. It is observed through behaviour. For example the reading ability of an individual can only be measured when 'e is asked to read a written material.

(f) **It is a means to an end but not an end itself.** The objective of educational measurement is not just to measure a particular attribute. Rather it is done to evaluate to what extent different objectives have been achieved.

WHAT IS EVALUATION

Evaluation is a broader term than the measurement. It is more comprehensive than mere measurement. It is more inclusive than the term

measurement. It goes ahead of measurement which simply indicates the numerical value. (It gives the value judgement to the numerical value. It includes both tangible and intangible qualities) Different educationists have defined evaluation as following.

James M. Bradfield. Evaluation is the assignment of symbols to phenomenon, in order to characterise the worth or value of a phenomenon, usually with reference to some social, cultural or scientific standards.

Thorndike and Hegan. The term evaluation is closely related to measurement. It is in some respect, more inclusive including informal and intuitive judgements of pupil's progress. Evaluation is describing something in terms of selected attributes and judging the degree of acceptability or suitability of that which has been described.

Norman E. Gronlund and Robert L. Linn. Evaluation is a systematic process of collecting, analysing and interpreting information to determine the extent to which pupils are achieving instructional objectives.

C.V. Good. The process of ascertaining or judging the value or amount of something by use of a standard of appraisal, includes judgement in terms of internal evidence and external criteria.

From the above definitions it can be said that evaluation is a much more comprehensive and inclusive term than the measurement and test. A test is a set of questions, measurement is assigning numbers to the results of the test according to some specific rules on the other hand evaluation adds value judgement.

For example when we say Rohan secured 45 numbers in Arithmetic. It just indicates 'how much' Rohan has successfully answered. It does not include any qualitative description *i.e.* 'how good' he is in Arithmetic. Evaluation on the other hand includes both quantitative description (measurement) and qualitative description (Non measurement) along with value judgements. This relationship between measurement, non measurement and evaluation can be illustrated with the help of following diagram (1.1)

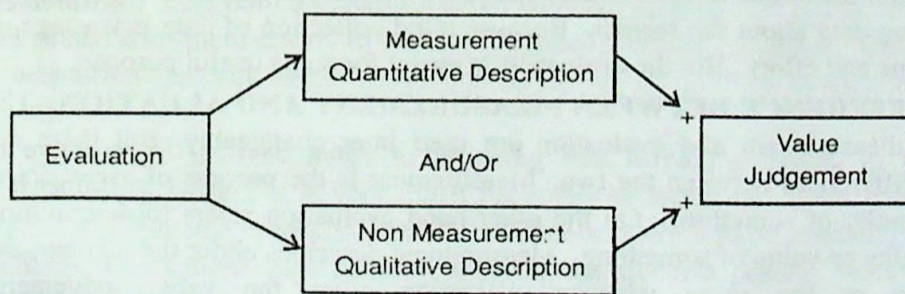


Fig. 1.1

PRINCIPLES OF EVALUATION : Evaluation is a systematic process of determining to what extent instructional objectives has been achieved. Therefore evaluation process must be carried out with effective techniques. The following principles will help to make the evaluation process an effective one.

1. It must be clearly stated what is to be evaluated : A teacher must be clear about the purpose of evaluation. He must formulate the instructional objectives and define them clearly in terms of student's observable behaviour. Before selecting the achievement measures the intended learning outcomes must be specified clearly.

2. A variety of evaluation techniques should be used for a comprehensive evaluation. It is not possible to evaluate all the aspect of achievement with the help of a single technique. For the better evaluation the techniques like objective tests, essay tests, observational techniques etc. should be used. So that a complete picture of the pupil achievement and development can be assessed.

3. An evaluator should know the limitations of different evaluation techniques. Evaluation can be done with the help of simple observation or highly developed standardised tests. But whatever the instrument or technique may be it has its own limitation. There may be measurement errors. Sampling error is a common factor in educational and psychological measurements. An achievement test may not include the whole course content. Error in measurement can also be found due to students guessing on objective tests. Error is also found due to incorrect interpretation of test scores.

4. The technique of evaluation must be appropriate for the characteristics or performance to be measured. Every evaluation technique is appropriate for some uses and inappropriate for another. Therefore while selecting an evaluation technique one must be well aware of the strength and limitations of the techniques.

5. Evaluation is a means to an end but not an end in itself. The evaluation technique is used to take decisions about the learner. It is not merely gathering data about the learner. Because blind collection of data is wastage of both time and effort. But the evaluation is meant for some useful purpose.

DIFFERENCE BETWEEN MEASUREMENT AND EVALUATION. The words measurement and evaluation are used interchangeably. But there are some differences between the two. Measurement is the process of ascertaining the quantity of something. On the other hand evaluation refers to determining the quality or value of something. Measurement describes about the number, the quantity or the score whereas evaluation gives the value judgement. Measurement answers to the question 'How much' and evaluation answers to the

question 'How good'. The major distinction between measurement and evaluation may be summarized as under.

Measurement	Evaluation
<ul style="list-style-type: none"> • Measurement refers to the observations that can be expressed quantitatively. • Measurement answers to the question 'How much'. • Measurement is precise and objective. • Measurement assign numerical value to quantify the data. • Measurement is concerned with, knowing the level of attainment. • Measurement is the science of collecting information about objects to be studied. 	<ul style="list-style-type: none"> • Evaluation is qualitative expression of the data. <i>Eq</i> • Evaluation answers to the question 'How good'. <i>AIA</i> • Evaluation is subjective. <i>o</i> • Evaluation adds value judgement to state the quality of data. <i>A</i> • Evaluation is concerned with its improvement. <i>K</i> • Evaluation includes the use of information collected by the process of measurement.

FUNCTIONS OF EVALUATION

The main aim of teaching learning process is to enable the pupil to achieve intended learning outcomes. In this process the learning objectives are fixed then after the instruction learning progress is periodically evaluated by tests and other evaluation devices. From the previous discussion we can form an idea of the function of evaluation process and that can be summerised as following.

1. Evaluation helps in preparing instructional objectives. Learning outcomes expected from class-room discussion can be fixed by using evaluation results. What type of knowledge and understanding the student should develop? What skill they should display? What interest and attitude they should develop? Can only be possible when we shall identify the instructional objectives and state them clearly in terms of intended learning outcomes. Only a good evaluation process helps us to fix up a set of perfect instructional objectives.

2. Evaluation process helps in assesing the learner's needs. In the eaching learning process it is very much necessary to know the needs of the earners. The instructor must know the knowledge and skills to be mastered by he students. Evaluation helps to know whether the students possess required knowledge and skills to proceed with the instruction.

3. Evaluation help in providing feed back to the students. An evaluation

process helps the teacher to know the learning difficulties of the students. It helps to bring about an improvement in different school practices. It also ensures an appropriate follow-up service.

4. Evaluation helps in preparing programmed materials. Programmed instruction is a continuous series of learning sequences. First the instructional material is presented in a limited amount then a test is given to response the instructional material. Next feed back is provided on the basis of correctness of response made. So that without an effective evaluation process the programmed learning is not possible.

5. Evaluation helps in curriculum development. Curriculum development is an important aspect of the instructional process. Evaluation data enable the curriculum development, to determine the effectiveness of new procedures, identify areas where revision is needed. Evaluation also helps to determine the degree to what extent an existing curriculum is effective. Thus evaluation data are helpful in constructing the new curriculum and evaluating the existing curriculum.

6. Evaluation helps in reporting pupil's progress to parents. A systematic evaluation procedure provides an objective and comprehensive picture of each pupil's progress. This comprehensive nature of the evaluation process helps the teacher to report on the total development of the pupil to the parents. This type of objective information about the pupil provides the foundation for the most effective co-operation between the parents and teachers.

7. Evaluation data are very much useful in guidance and counselling. Evaluation procedures are very much necessary for educational, vocational and personal guidance. In order to assist the pupils to solve their problems in the educational, vocational and personal fields the counsellor must have an objective knowledge of the pupils abilities, interests, attitudes and other personal characteristics. An effective evaluation procedure helps in getting a comprehensive picture of the pupil which leads to effective guidance and of counselling.

8. Evaluation helps in effective school administration. Evaluation data helps the administrators to judge the extent to which the objectives of the school are being achieved, to find out strengths and weaknesses of the curriculum and arranging special school programmes. It also helps in decisions concerning admission, grouping and promotion of the students.

9. Evaluation data are helpful in school research. In order to make the school programme more effective, researches are necessary. Evaluation data help in research areas like comparative study of different curricula, effectiveness of different methods, effectiveness of different organisational plans etc.

TYPES OF EVALUATION PROCEDURE

Evaluation procedure can be classified in to different categories in many ways. But some of the important ways of classification are—

- (a) According to the use in class room instruction.
- (b) According to the nature of measurement.
- (c) According to the method of interpretation of results.

Classification according to use in class room instruction. Measurement and evaluation can be classified according to their functional role in the class room instruction. It can be arranged in the sequential order of their use.

1. Placement Evaluation.
2. Formative Evaluation.
3. Diagnostic Evaluation.
4. Summative Evaluation.

PLACEMENT EVALUATION Placement evaluation is designed to place the right person in the right place. It measures the entry performance of the pupil. (The future success of the instructional process depends on the success of placement evaluation.) When a pupil is to undertake a new instruction, it is essential to know the answer of the following questions.

- Does the pupil possesses required knowledge and skills for the instruction ?
- Whether the pupil has already mastered some of the instructional objectives or not ?
- Whether the mode of instruction is suitable to pupil's interests, work habits and personal characteristics ?

So evaluation of the pupil answers all these above questions and helps the teacher to decide, where to start instruction. The teacher requires the use of a variety of techniques such as Readiness tests, Aptitude tests, Selfreporting inventories, Observational techniques, pre-test on course objectives etc. The chief aim of placement evaluation is to know the position of the pupil in the instructional sequence and to place him in that position so that optimum result may be achieved.

FORMATIVE EVALUATION

Formative evaluation is used during the teaching learning process to monitor the learning progress. It helps the students and the teachers both to identify the immediate learning difficulties. On the basis of which a teacher can provide feed-back to the students and to himself. Feed-back to the students eliminate the learning errors and provides reinforcement for successful learning. Feed-back to