

EDUCATIONAL MEASUREMENT AND EVALUATION

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ABSTRACT

Effective teaching can be defined in many ways including teacher behavior, teacher knowledge, teacher beliefs, and so forth. Effective teaching as the ability to improve student achievement. It enables a teacher that how learning process should be initiated, how to motivate, how to memorize or learn. It helps teachers to guide the students in right direction in order to canalized student's abilities in right direction. Educational measurement is an act or a process that involves the assignment of a numerical index to whatever is being assessed. The term educational measurement is used to measure physical qualities of a thing or a person and psychological and educational qualities of a person. For example, we measure the height, weight and age of a child and also measure its intelligence, abilities in various fields. Physical measurement is direct and simple and its tools are meter, liter, gram etc. Psychological and educational measurements are complex and expressed in grades or marks. Educational measurement helps to know a particular phase of child's personality. Evaluation is a comprehensive and continuous process which assesses overall personality of a child. It is quantitative as well as qualitative description of pupils' achievement. It encompasses the terms 'test' 'measurement' and 'examination' and they are quantitative tools of evaluation. The methods of measurement such as tests, inventories, observation, interview, checklist, rating scales, attitude scales and projective techniques are useful to measure the student progress. Formative evaluation, summative evaluation and diagnostic evaluation are essential to identify the student's weakness and strengths. Quantitative and qualitative tools of evaluation such as oral tests, written tests, observation techniques, sociometric techniques and self-report techniques are useful for teacher to measure the student's performance in the teaching-learning process. The objectives of educational measurement and evaluation are to find out the student's achievement and motivate them to learn, identify the strengths and weakness of the learner, discuss the tools and techniques of educational measurement and evaluation, develop cognitive skills, psychomotor skills and affective skills among the learners and make the educational measurement and evaluation an integral part of teaching-learning process.

Keywords: *Educational Measurement, Educational Evaluation, Methods of Measurement, Qualitative Evaluation Tool, Quantitative Evaluation Tool.*

Introduction

Effective teachers demonstrate a deep understanding of the curriculum. Effective teaching can be defined in many ways including teacher behavior, teacher knowledge, teacher beliefs, and so forth. Effective teaching as the ability to improve student achievement. Psychology helps teacher to know that how learning takes place. It enables a teacher that how learning process should be initiated, how to motivate, how to memorize or learn. It helps teachers to guide the students in right direction in order to canalized student's abilities in right direction. They plan, teach, and assess to promote mastery for all students. Effective teachers provide high-quality instruction to increase student achievement for all students.

Some of the key characteristics of effective teachers include a sense of humour, making classes interesting, subject-matter knowledge, fairness, respect, consideration of and equal treatment for all students, and the ability to explain things clearly. Subject-matter competence, the use of effective instructional strategies, goal setting, planning, classroom management, motivation, and cultural

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sensitivity are some of the knowledge's and skills required by members of the teaching profession. Caring about students as individuals and learners, having a positive attitude about teaching, and self-motivation are key elements for teaching. Effective teaching involves life-long learning and continuous professional growth. Developing a positive self-identity, seeking advice from competent and experienced teachers, and developing and maintaining a database of resources and supports are all part of professional growth in teaching.

Evaluation is an integral part of educational process. Since it is responsibility of the teacher to conduct test or examination it is necessary for the teacher to understand the terms test, examination, measurement and evaluation and their use. The concept as follows:

Test

Test is a device or a procedure. It consists of a standard set of questions on a particular subject that are to be answered by the students. Every student answers the questions independently. Result of the test is given in terms or numerical value that explains student's performance or nature. It is a verbal description which helps in comparing quantitative performance of different students

Examination

Examination is a procedure which is used to assess student's scholastic achievement, i.e., his proficiency in subject matter. Examination is terminative or periodical. Annual examination, semester examination are examples for examination. It is quantitative tool of evaluation.

Educational Measurement

Educational Measurement is an act or a process that involves the assignment of a numerical index to whatever is being assessed. The term educational measurement is used to measure physical qualities of a thing or a person and psychological and educational qualities of a person. For example, we measure the height, weight and age of a child and also measure its intelligence, abilities in various fields. Physical measurement is direct and simple and its tools are meter, liter, gram etc. Psychological and educational measurements are complex and expressed in grades or marks. Educational measurement helps to know a particular phase of child's personality.

Evaluation

Evaluation is a comprehensive and continuous process which assesses overall personality of a child. It is quantitative as well as qualitative description of pupils' achievement. It encompasses the terms 'test' 'measurement' and 'examination' and they are quantitative tools of evaluation.

The following are the important aspects of evaluation.

- Evaluation is a continuous process which is associated with objectives and implementations.
- It is a comprehensive process. It is not only concerned with the determination of learning results and course of action, but also recommends for the improvement of the child, society, nation and mankind.
- A comprehensive program of evaluation involves the use of many procedures, tests and techniques.
- Evaluation is a co-operative activity involving principal, teachers, students and parents.
- It is both quantitative and qualitative.

Differences between Educational Measurement and Evaluation

The following are the differences between the educational measurement and evaluation.

- While evaluation is a new concept Measurement is an old concept.
- While evaluation is a technical. Measurement is a simple word.
- While the scope of evaluation is wider. The scope of measurement is narrow.
- In evaluation pupil's qualitative progress. In measurement only quantitative progress of the pupils can be explored. Changes and behavioral are tested in evaluation, the learning experiences are pre-determined teaching objectives are tested. In measurement the content skill and basis objectives are tested provided to the pupils in accordance with of some objectives but the result is expressed in numerals, scores testing, average and percentage.
- The qualities are measured in the evaluation as a whole. In measurement, the qualities are measured as separate units.

- Evaluation is the process by which the previous effects and hence caused behavioural changes are tested.
- Measurement means only those techniques which are used to test a particular ability of the pupil.
- In evaluation, various techniques like observation, hierarchy, criteria, interest and tendencies measurement etc. are used for testing the behavioural changes. In measurement, personality test, intelligence test and achievement test etc. are included.
- Evaluation is that process by which the interests, attitudes, tendencies, mental abilities, ideals, behaviors and social adjustment etc. of pupils are tested. By measurement, the interests, attitudes tendencies, ideals and behaviors cannot be tested.
- The evaluation aims at the modification of education system by bringing a change in the behavior. Measurement aims at measurement only.

Need and Importance of Educational Measurement and Evaluation

The need and importance of educational measurement and evaluation can be explained in the following way.

- Educational measurement measures the ability of students, finding out their interests and aptitude at the time of admission, and admit them on its basis. Evaluation tests the educational importance of the activities of educational administrators, other personnel and guardians from time to time, and to suggest for improvement.
- Educational measurement measures their intelligence and personality after admission and accordingly divide them into specific classes, and to assist in their personality development. Evaluation analyses the educational objectives, to test their utility, and to suggest for timely change.
- Educational measurement finds out from time to time the effect of teaching on the student's educational achievements or change of behaviour, and to guide the students on its basis and to inspire them to learn. Evaluation finds out the effect of the curriculum at different levels in the achievement of educational objectives, to give suggestions for improvement and to enlighten for research.
- Educational measurement and evaluation measures and evaluate the educational achievements of students from time to time and to provide them feedback.
- Educational measurement and evaluation find out the hindrances in the educational progress of the students and remedy them.

Objectives of Educational Measurement and Evaluation

The following are the objectives of educational measurement and evaluation.

- Find out the student's achievement and motivate them to learn.
- Identify the strengths and weakness of the learner.
- Discuss the tools and techniques of educational measurement and evaluation
- Develop cognitive skills, psychomotor skills and affective skills among the learners.
- Make the educational measurement and evaluation an integral part of teaching-learning process.

Methods and Procedures

For this research paper, secondary data analysis is usually collected from the internet, textbooks, reference books, journals, research papers and various published articles on the same subject.

Educational Measurement and Evaluation

The educational measurement and evaluation can be explained in the following way.

Types of Measurement

The following are the types of measurement.

- **Physical Measurement**

Physical measurement is the measurement of the object which has absolute existence. For example, we measure the height of individuals, the weight of rice, etc. Here, we directly measure the height or weight of an individual and all the measuring tools of physical measurement start from zero. Physical measurement is always accurate and quantitative, and there are some set of tools for physical measurement all over the world.

- **Mental Measurement**

Mental measurement is also known as 'educational measurement' or 'psychological measurement'. It is always relative and there is no absolute zero in case of mental measurement. For example, for measuring the intelligence of a person we have to take the help of intelligence tests which are subjective in nature. Through his response, we can know the level of intelligence of the person concerned. Mental measurement is both qualitative and quantitative in nature, and there are no fixed tools for such measurement i.e., the same set of tools may not be applied to different types of persons.

Methods of Measurement

For both physical and mental measurement, some tools and methods are necessary. The variation of method may be due to the nature of variable and purpose of measurement. The methods of measurement are as follows:

- **Tests**

A test consists of a set of questions to be answered or tasks to be performed. Tests are used to assess the ability or trait in question. Psychological and educational tests are standardized procedure to measure quantitatively or qualitatively one or more than one aspect or trait by means of a sample of verbal or non-verbal behaviours. The psychological tests are used to know the ability of the students, to diagnose the weakness, to predict the future progress, and to provide educational and vocational guidance. The different types of tests are: achievement tests, intelligence tests, attitude tests, aptitude tests, personality tests, creativity tests etc.

- **Inventories**

Different inventories are used for different traits. Interest inventories are used to measure interest; personality inventories are used to measure certain traits on personality.

- **Observation**

There are certain traits like honesty, punctuality, persistence, truthfulness etc., which can hardly be measured objectively via tests. So here, observation is an important technique of measurement. The observation may be participant observation or non-participant observation for accurate and scientific observation.

- **Interview**

Interview is a face-to-face interaction between one interviewee and one interviewer or more than one interviewers. There are certain things which an individual does not want to express and they can be only assessed through interviews. The interview schedules may be used and the interviewer through a better personal support, and in congenial atmosphere, can succeed to bring out the inner feelings of the interviewee through carefully planned interviews.

- **Checklist**

A checklist consists of a series of items which needs response from the respondent. The presence or absence of an item may be indicated by 'Yes' or 'No'. Checklists are popularly employed for appraisal of studies, school buildings, textbooks, outcomes, instructional procedures etc.

- **Rating Scales**

Rating scale is used to evaluate the personal and social conduct of the learner. We take the opinion of teachers or parents or friends or judges on a particular quality or trait of a pupil along a scale. The rating scale may be of 5 points, 7 points, 9 points or 11 points. For example, to assess particular trait, we can use a 5-point scale as: very good, good, average, below average, and poor. Rating scales can be used to evaluate: personality traits, tests, school courses, school practices, and other school programmes.

- **Attitude Scales**

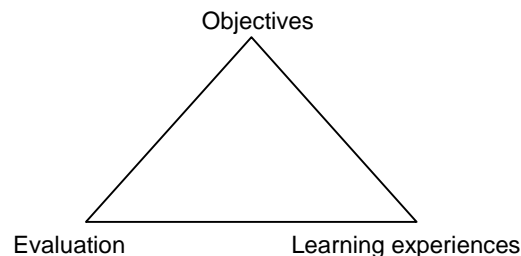
Attitude refers to the bent of mind or feelings of an individual towards an object, an idea, an institution, a belief, a subject or even a person. Attitude scales are used to measure this trait objectively with accuracy.

- **Projective Techniques**

Projective techniques are very ambiguous and subjective in nature. Through projective techniques, the sub-conscious and pre-conscious mind of an individual is reflected. For example, with the help of Thematic Apperception Test (TAT), we measure the personality of individuals.

Process of Evaluation

Educational evaluation is a systematic, continuous process which determines the attainment of specified educational objectives and the effectiveness of the learning experience. The process of evaluation can be explained with the help of the following diagram.



The evaluation process includes mutually interrelated aspects. They are:

- Objectives
- Learning experiences
- Evaluation

• Educational Objectives

Educational objectives predetermined goals of education which helps to decide what kind of knowledge, abilities, and skills should be developed in children. They are stated in terms of knowledge, understanding, skill, application, attitudes, appreciation and interest. On the basis of educational objectives specific objectives are framed by the teacher for instruction of a particular topic. These specific objectives will provide direction to teaching-learning process and useful in planning and organizing the learning activities.

• Learning Experiences

In order to achieve predetermined specific objectives teacher, provide learning activities by employing suitable methods and techniques. Learning experiences are results of learning activities or after-effects learning activities. Thus, desirable learning experiences or behavioral changes take place in children.

• Evaluation

It is to test to the what extent specific objectives of teaching are achieved the teacher construct a test by making maximum use of the teaching points already introduced in the class and learning experiences already acquired by the students. Teacher selects testing tool according objectives and nature of learning experiences. The results of the test provide feedback on the effectiveness of learning experiences and ultimately on the achievement of the objectives. On that basis teacher designs further teaching process for the betterment of the students.

Thus objectives, learning experiences and evaluation are interrelated and that indicates that the process of evaluation is a continuous process and evaluation is associated with educational objectives.

Types of Evaluation

Evaluation may be classified as Formative evaluation, Summative evaluation and Diagnostic Evaluation.

• Formative Evaluation

Formative evaluation is the assessment made by the teacher during teaching learning process in order to know about learners' progress in learning and make essential changes to improve teaching learning process. Formative evaluation is a continuous process that simultaneously happens with teaching. Asking questions during classroom teaching, classroom assignments, home assignments informal interviews with students etc., are examples of formative evaluation.

Need and Importance of Formative Evaluation

- Formative evaluation is must to provide immediate feedback to teacher so that he/she can modify and improve instruction.
- It is also necessary to provide feedback to students enable them to identify their learning errors and rectify them immediately.

- Since it is child centered, it gives more importance to students' achievement or their learning.
- It is a flexible way of evaluation.
- It helps in designing remedial teaching by providing data of student's performance regularly.

Summative Evaluation

Summative evaluation is the assessment made at the end of the term, semester, course or instructional program to assign a grade for learners. The term summative means the summing up of all the available information regarding a program at its terminal point. Unit test, quarterly examination, half yearly examination, semester examination and annual examination are examples of summative evaluation. Summative test is given to a learner after he/she has passed all the formative tests.

Need and Importance of Summative Evaluation

- The summative evaluation is conducted to give overall picture of student's performance.
- To find out general status or level of a students. It helps in determining the extent to which the objectives have been achieved.
- By providing information about students' performance periodically help the teacher improve teaching procedure, planning and organizing further teaching.
- The need of summative evaluation is to assign grades or provide certificate on completion of course or provide periodic report to parents.

Diagnostic Evaluation

It helps in providing information regarding what the students know about a certain topic, contents or area of learning that is going to be taught to them. It may help the teacher to plan his instructional programme suiting the needs, interest and abilities of the students. It is diagnosing the students understanding and interest. The main objective of diagnostic evaluation in social sciences is to find out the nature and cause of the persistent learning problems and to formulate a plan for seeking suitable remedial actions.

Differences between Formative and Summative Evaluation

- Formative evaluation is continuous process as it is conducted during teaching learning process. Whereas summative evaluation is terminal as it is conducted after completion of program or course of study.
- Formative evaluation is child centered whereas summative evaluation is objective centered.
- The main purpose of formative evaluation is to provide immediate feedback to the teacher as well as to the students to improve their respective tasks. Summative evaluation is intended to find out general status of the students and to assign grades or certify.
- Tools of formative evaluation are daily assignments, observation and interview etc. periodical tests and projects are tools of summative evaluation.
- Formative evaluation is means of interaction between teacher and students, whereas summative evaluation develops interaction between school and community.

Quantitative and Qualitative Tools of Evaluation

The following are the quantitative and qualitative tools of evaluation.

Quantitative Tools of Evaluation

Scholastic achievement test are quantitative tools of assessing objectives in cognitive and psychomotor domain or to find out students' achievement of students in relation to the instruction provided in a particular subject.

Oral Tests

These are used for testing individual student performance. It is a face-to-face question answer activity between the teacher and students. In oral test question should be asked in logical order in order to develop a line of thinking. Interview, viva-voce, quiz contest, conference, panes discussion, are examples of oral tests. Such type of tests helps the teacher to understand students' level of thinking, spontaneous responding capacity, organizing ideas, expressing views clearly.

Written Tests

Written test requires students to write answer in a sentence or a paragraph or longer passages. Here student is expected to organize his/her ideas and answer in his/her own words. They demand subjective judgment. They are classified as essay type, short answer type and objective type.

- **Essay Type Test**

It is a written test in which the student is asked to discuss, explain, criticize, evaluate, justify, analyze, elaborate, compare and contrast, give reasons etc. this type of tests evaluate student's ability of organizing, integrating, analyzing, and synthesizing of ideas. Easy to prepare and conduct, test student's ability of analyzing, synthesizing, criticizing, justifying ideas or views. It encourages good study habits as it eliminates guessing. But very subjective in nature.

- **Short Answer Type**

This type expects the student to answer in few sentences or in a paragraph. Short answer type tests are more specific than essay type tests, because answer are to be written in specified context only. Thought provoking questions, questions on definitions, classification, give example questions etc., come under short answer type questions.

- **Objective Type of Tests**

These are written tests in which student is required to select correct answer among given answers for a question. These are more objective in nature because scoring will not different from examiner to examiner. Another important point is that teacher can construct more questions on a topic.

Qualitative Tools of Evaluation

These tools of evaluation are used to assess objectives on affective domain. For evaluating attitudes, interest, and qualities, observation techniques, sociometry techniques are used self-report techniques are useful.

- **Observation Techniques**

The teacher should continually observe his/her students in order to study specific behavior in relation to subject. The observation tools are rating scale, anecdotal record and cumulative record. They provide valuable information about student's behavior help the teacher to correct and improve students' behavior.

- **Rating Scale**

It is an observational technique which enables the teacher to indicate the degree to which a particular trait or characteristic is present in a student. It helps teacher to rate his/her students on various traits like punctuality, regularity, co-operation in group activities, and attitude towards the work.

For example:

How was performance in project work.

Excellent	Very good	Good	Average	Poor
1	2	3	4	5

- **Anecdotal Record**

Anecdotal record is description of student's behavior which explains significant event or meaningful event or behavior of students on informal occasions. In it, teacher describes what happened, when it happened and under what circumstances behavior occurred. It means, teacher should mention date, time and situation of incident or behavior. This information helps the teacher in understanding and guiding students. Here, observation should be selective and observe those aspects of behavior which cannot be evaluated by other means.

- **Cumulative Record**

It is a record of various aspects of the child personality such as academic achievement, regularity, punctuality, health, hobbies, attitudes, interests, likes and dislikes etc. giving cumulative picture of child's personality helps in understanding changes, growth and development of child personality and take actions accordingly.

- **Sociometric Techniques**

These techniques are used to evaluate interpersonal relationships, structuring of groups in classroom, social climate and personal and social adjustment of a child in the classroom. It is useful to find out leaders, rejecters, stars and isolates etc. For this, teacher can device a series of questions that will elicit a student's feeling about other members in the class. Teacher can use these techniques for organizing groups for group activity or projects, to improve social climate in the classroom and to guide isolated students.

- **Self-Report Techniques**

These techniques are used to obtain information about the student directly from him/her for evaluation purpose. The purpose of self-report technique is to obtain relevant information from the students by using tools such as interviews, inventories and attitude scale.

- **Interview**

An interview is a face-to-face personal conference in which the required information is obtained directly from the individual. It can be conducted in a formal way or informal way. Teacher can use this technique to get information regarding a student's interest, attitude and adjustment problems. It helps in guiding and counseling.

- **Pupil Interest Inventories**

When teacher requires an information regarding student's interest in the subject activities, present him/her a series of questions or statements and get direct response.

- **Attitude Test**

An attitude is a point of view which one holds towards a person, object, task or idea. It may be positive or negative, hostile or indifferent. Attitudes are not directly observable, but inferred from one's own behavior, both verbal and non-verbal.

To test attitudes of students, attitude scales are prepared. On attitude scale, various statements are given with responses. The student is asked to check for each statement, and mark one of the responses, which states more accurately, how he/she feels about it.

Results and Discussion

The following are the results of the educational measurement and evaluation.

- Evaluation is more comprehensive term than measurement and testing.
- Making examinations more flexible and integrated into classroom teaching.
- Educational measurement and evaluation provide quantitative as well as qualitative description of the outcomes of a teaching – learning process.
- It helps knowing about the changes in the behavior related to the domains of the learner's behavior as a result of the process of teaching- learning.
- It provides greater scope and flexibility for the use of variety of means and techniques rather than limiting itself to certain tests or conventional examinations.
- It represents a comprehensive pain of better testing and measurement for inquiring into the quality of the output in the light of the set of objectives.
- Ensuring that learning is shifted away from rote methods and memory oriented and focus on self-expression.
- The educational measurement and evaluation tools are not only pen paper but also oral, projects, observations, portfolios, class work, activity reports etc.,
- The educational measurement and evaluation made comprehensive including co-curricular areas such as Art Education, Games and Sports, Work Experience, Value Education etc.,
- Assessment starts with a base line assessment at the beginning of academic year for all subjects and classes based on which the teacher set targets and plan for teaching.

Conclusion

Educational measurement and Evaluation is more comprehensive measurement tools for testing the learner educational performance. It represents a continuous process and overall efforts for knowing about the progress of the learner. It provides quantitative as well as qualitative description of the outcomes of a teaching- learning process. It helps knowing about the changes in the behavior related to the domains of the learner's behavior as a result of the process of teaching-learning. It provides greater scope and flexibility for the use of variety of means and techniques rather than limiting itself to certain tests or conventional examinations. It represents a comprehensive pain of better testing and measurement for inquiring into the quality of the output in the light of the set of objectives.

References

1. Shepard, L.A. (2000), "The role of assessment in a learning culture" Educational Researcher, 4-14.
2. Stiggins, R. (2005), "From formative assessment to assessment for learning: A path to success in standards-based schools" Phi Delta Kappan, 324-328.

3. Glaser, R., Chudowsky, N., & Pellegrino, J.W. (Eds.) (2001), "Knowing what students know: The science and design of educational assessment", National Academies Press.
4. Delpit, L.D. (1988), "The silenced dialogue: Power and pedagogy in educating other people's children," *Harvard Educational Review*, 58(3), 280-299.
5. Delpit, L.D. (2012), "Multiplication is for white people: Raising expectations for other people's children," The New Press.
6. Bransford, J., Brown, A.L., & Cocking, R.R. (Eds.). (2000), "How people learn: Brain, mind, experience, and school," Washington, DC: National Academy Press.
7. Burke, K. (2005), "How to assess authentic learning (4th Ed.)", Thousand Oaks, CA: Corwin.
8. Burke, K., Fogarty, R., & Belgrad, S (2002), "The portfolio connection: Student work linked to standards (2nd Ed.)", Thousand Oaks, CA: Corwin.
9. Carr, J.F., & Harris, D.E. (2001), "Succeeding with standards: Linking curriculum, assessment, and action planning. Alexandria, VA: Association for Supervision and Curriculum Development."
10. Danielson, C. (2002), "Enhancing student achievement: A framework for school improvement. Alexandria, VA: Association for Supervision and Curriculum Development".
11. Gentile, J.R. & Lalley, J.P. (2003), "Standards and mastery learning: Aligning teaching and assessment so all children can learn", Thousand Oaks, CA: Corwin.
12. Guskey, T.R., & Bailey, J.M. (2001), "Developing grading and reporting systems for student learning". Thousand Oaks, CA: Corwin.
13. Natrajan V.and Kulshreshta SP(1983), "Assessing non-Scholastic Aspects-Learners Behaviour", New Delhi: Association of Indian Universities

