

# **BHARATHIDASAN UNIVERSITY**

**TIRUCHIRAPPALLI – 620 024**

## **CENTRE FOR DISTANCE EDUCATION**



## **ASSESSMENT FOR LEARNING**

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## **UNIT – I**

# **PERSPECTIVES ON ASSESSMENT AND EVALUATION**

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## **1.1. INTRODUCTION**

The term Assessment has been widely used by educators to evaluate, measure, and document the academic readiness, learning progress, and skill acquisition of students throughout their learning in life. Different terminologies are there for assessment and evaluation such as Measurement, Tests, Examination, Appraisal and Evaluation. There are certain Learning theories which are having conceptual frameworks describing how information is absorbed, processed and retained during learning. Behaviourism is a philosophy of learning that only focuses on objectively observable behaviors and discounts mental activities. Piaget proposed that a child's cognitive structure increases in sophistication with development, moving from a few innate reflexes such as crying and sucking to highly complex mental activities. Constructivist learning theory stated that the process of adjusting our mental models to accommodate new experiences. Assessments are classified based on the different purposes, scopes, attribute measured, nature of information gathered, nature of interpretation and context.

## **1.2. LEARNING OBJECTIVES**

After learning this unit, you will be able to

- describe the meaning Assessment and different evaluations
- state the purposes, principles and characteristics of quality assessment
- bring out the specialty of different learning theories like Behaviorist, Cognitivist and Constructivist of
- classify the assessment based on purpose, scope, attribute measured, nature of information gathered, nature of interpretation and context

### **1.2.1 Meaning of Assessment**

In education, the term assessment refers to the wide variety of methods that educators use to evaluate, measure, and document the academic readiness, learning progress, and skill acquisition of students from preschool through college and adulthood. It is the process of systematically gathering information as part of an evaluation. Assessment is carried out to see what children and young people know, understand and are able to do. Assessment is very important for tracking progress, planning next steps, reporting and involving parents, children and young people in learning.

### **1.2.2 Meaning of Measurement**

Measurement is actually the process of estimating the values that is the physical quantities like; time, temperature, weight, length etc. each measurement value is represented in the form of some standard units. The estimated values by these measurements are actually compared against the standard quantities that are of same type. Measurement is the assignment of a number to a characteristic of an object or event, which can be compared with other objects or events. The scope and application of a measurement is dependent on the context and discipline.

### **1.2.3 Meaning of Tests**

A procedure intended to establish the quality, performance or reliability of something, especially before it is taken into widespread use.

### **1.2.4 Meaning of Examination**

The act of examining or state of being examined (Education). Written exercises, Oral questions or practical tasks, set to test a candidate's knowledge and skill (as modifier): an examination paper.

### **1.2.5 Meaning of Appraisal**

An assessment or estimation of the worth, value or quality of a person or thing. Impartial analysis and evaluation conducted according to established criteria to determine the acceptability, merit, or worth of an item.

### **1.2.6 Meaning of Evaluation**

Evaluation is a broader term that refers to all of the methods used to find out what happens as a result of using a specific intervention or practice. Evaluation is the systematic assessment of the worth or merit of some object. It is the systematic acquisition and assessment of information to provide useful feedback about some object.

### **1.2.7 Interrelation among Assessment, Evaluation and Measurement**

Though the terms assessment and evaluation are often used interchangeably (Cooper, 1999), many writers differentiate between them. Assessment is defined as gathering information or evidence, and evaluation is the use of that information or evidence to make judgments (Snowman, McCown, and Biehler, 2012). Measurement involves assigning numbers or scores to an "attribute or characteristic of a person in such a way that the numbers describe the degree to which the person possesses the attribute" (Nitco and Brookhart, 2011, p. 507). Assigning grade equivalents to scores on a standardized achievement test is an example of measurement.

## **1.3 PURPOSES OF ASSESSMENT**

### **1.3.1 Teaching and Learning**

The primary purpose of assessment is to improve students' learning and teachers' teaching as both respond to the information it provides. Assessment for learning is an ongoing process that arises out of the interaction between teaching and learning.

What makes assessment for learning effective is how well the information is used.

### **1.3.2 System improvement**

Assessment can do more than simply diagnose and identify students' learning needs; it can be used to assist improvements across the education system in a cycle of continuous improvement:

- Students and teachers can use the information gained from assessment to determine their next teaching and learning steps.
- Parents and families can be kept informed of next plans for teaching and learning and the progress being made, so they can play an active role in their children's learning.
- School leaders can use the information for school-wide planning, to support their teachers and determine professional development needs.
- Communities and Boards of Trustees can use assessment information to assist their governance role and their decisions about staffing and resourcing.
- The Education Review Office can use assessment information to inform their advice for school improvement.

- The Ministry of Education can use assessment information to undertake policy review and development at a national level, so that government funding and policy intervention is targeted appropriately to support improved student outcomes.

## **1.4 PRINCIPLES OF ASSESSMENT**

### **a. Reliability**

A test can be reliable but not valid, whereas a test cannot be valid yet unreliable. Reliability, in simple terms, describes the repeatability and consistency of a test. Validity defines the strength of the final results and whether they can be regarded as accurately describing the real world.

### **b. Validity**

The word "valid" is derived from the Latin *validus*, meaning strong. The validity of a measurement tool (for example, a test in education) is considered to be the degree to which the tool measures what it claims to measure; in this case, the validity is an equivalent to accuracy.

### **c. Relevance and transferability**

In education, the term relevance typically refers to learning experiences that are either directly applicable to the personal aspirations, interests or cultural experiences of students (*personal relevance*) or that are connected in some way to real-world issues, problems and contexts (*life relevance*).

Relevance is the concept of one topic being connected to another topic in a way that makes it useful to consider the first topic when considering the second. The concept of relevance is studied in many different fields, including cognitive sciences, logic, and library and information science. Most fundamentally, however, it is studied in epistemology (the theory of knowledge). Different theories of knowledge have different implications for what is considered relevant and these fundamental views have implications for all other fields as well.

Transferability in research is the degree to which the results of a research can apply or transfer beyond the bounds of the project. Transferability implies that results of the research study can be applicable to similar situations or individuals. The knowledge which was obtained

in situation will be relevant in another and investigators who carry out research in another context will be able to utilize certain concepts which were initially developed. It is comparable to generalisability.

Transferability in research is utilized by the readers of study. Transferability can apply in varying degrees to many types of research. Transferability doesn't involve broad claims, but invites readers of research to make associations between elements of research and their own experience. For example, lecturers at a school may selectively apply to their own class's results from a research indicating that heuristic writing exercises aid students at the university level. It is important that adequate thick description of the phenomenon under study is given to allow audience to have a proper understanding of it, thus enabling them to compare the instances of the phenomenon explained in the research document with those that they have seen emerge in their situations.

## **1.5 CHARACTERISTICS OF CLASSROOM ASSESSMENT**

The different characteristics of classroom assessment are given below.

- **Learner-Centered**

The primary attention of teachers is focused on observing and improving learning.

- **Teacher-Directed**

Individual teachers decide what to assess, how to assess, and how to respond to the information gained through the assessment. Teachers do not need to share results with anyone outside of the class.

- **Mutually Beneficial**

Students are active participants.

Students are motivated by the increased interest of faculty in their success as learners.

Teachers improve their teaching skills and gain new insights.

- **Formative**

Assessments are almost never "graded". Assessments are almost always anonymous in the classroom and often anonymous online. Assessments do not provide evidence for evaluating or grading students.



- **Context-Specific**

Assessments respond to the particular needs and characteristics of the teachers, students and disciplines to which they are applied.

Customize to meet the needs of students and course.

- **Ongoing**

Classroom assessment is a continuous process. Part of the process is creating and maintaining a classroom "feedback loop". Each classroom assessment event is of short duration.

- **Rooted in Good Teaching Practice**

Classroom assessment builds on good practices by making feedback on students' learning more systematic, more flexible and more effective.

### **Keys to Quality Classroom Assessment**

Key 1: Clear Purposes

Key 2: Clear Targets

Key 3: Sound Design

Key 4: Effective Communication

Key 5: Student Involvement

#### **Check your Progress-1**

1. Explain the term assessment.

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2. Give the definition of Palomba and Banta of assessment.

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3. What are the fundamental elements of learner-centered assessment?

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## **1.6 LEARNING THEORY**

Learning theories are conceptual frameworks describing how information is absorbed, processed and retained during learning. Cognitive, emotional, and environmental influences, as well as prior experience, all play a part in how understanding, or a world view, is acquired or changed and knowledge and skills retained.

Behaviorists look at learning as an aspect of conditioning and will advocate a system of rewards and targets in education. Educators who embrace cognitive theory believe that the definition of learning as a change in behavior is too narrow and prefer to study the learner rather than their environment and in particular the complexities of human memory. Those who advocate constructivism believe that a learner's ability to learn relies to a large extent on what he already knows and understands, and the acquisition of knowledge should be an individually tailored process of construction. Transformative learning theory focuses upon the often-necessary change that is required in a learner's preconceptions and world view.

### **1.6.1 Behaviorism**

Behaviorism is a philosophy of learning that only focuses on objectively observable behaviors and discounts mental activities. Behavior theorists define learning as nothing more than the acquisition of new behavior. Experiments by behaviorists identify conditioning as a universal learning process. There are two different types of conditioning, each yielding a different behavioral pattern:

- Classic conditioning occurs when a natural reflex responds to a stimulus.

The most popular example is Pavlov's observation that dogs salivate when they eat or even see food. Essentially, animals and people are biologically "wired" so that a certain stimulus will produce a specific response.

- Behavioral or operant conditioning occurs when a response to a stimulus is reinforced. Basically, operant conditioning is a simple feedback system: If a reward or reinforcement follows the response to a stimulus, then the response becomes more probable in the future. For example, leading behaviorist B.F. Skinner used reinforcement techniques to teach pigeons to dance and bowl a ball in a mini-alley.

How Behaviorism impacts learning:

- Positive and negative reinforcement techniques of Behaviorism can be very effective.
- Teachers use Behaviorism when they reward or punish student behaviours.

### 1.6.2 Cognitivism

Jean Piaget authored a theory based on the idea that a developing child builds cognitive structures, mental "maps", for understanding and responding to physical experiences within their environment. Piaget proposed that a child's cognitive structure increases in sophistication with development, moving from a few innate reflexes such as crying and sucking to highly complex mental activities.

The four developmental stages of Piaget's model and the processes by which children progress through them are: The child is not yet able to conceptualize abstractly and needs concrete physical situations. As physical experience accumulates, the child starts to conceptualize, creating logical structures that explain their physical experiences. Abstract problem solving is possible at this stage. For example, arithmetic equations can be solved with numbers, not just with objects. By this point, the child's cognitive structures are like those of an adult and include conceptual reasoning.

Developmental Stage	Cognitive Process
<b>Sensorimotor</b> stage (birth - 2 years old)	The child, through physical interaction with the environment, builds a set of concepts about reality and how it works. This is the stage where a child does not know that physical objects remain in existence even when out of sight.
<b>Preoperational</b> stage (ages 2 - 7)	
<b>Concrete</b> operations (ages 7 - 11)	
<b>Formal</b> operations (beginning at ages 11 - 15)	

Piaget proposed that during all development stages, the child experiences their environment using whatever mental maps they have constructed. If the experience is a repeated one, it fits easily - or is assimilated - into the child's cognitive structure so that they maintain mental "equilibrium". If the experience is different or new, the child loses equilibrium, and alters their cognitive structure to accommodate the new conditions. In this way, the child constructs increasingly complex cognitive structures.

How Piaget's theory impacts learning:

- Curriculum - Educators must plan a developmentally appropriate curriculum that enhances their students' logical and conceptual growth.
- Instruction - Teachers must emphasize the critical role that experiences, or interactions with the surrounding environment, play in student learning. For example, instructors have to take into account the role that fundamental concepts, such as the permanence of objects, play in establishing cognitive structures.

### **1.6.3 Constructivism**

Constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences we construct our own understanding of the world we live in. Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences.

#### **The guiding principles of Constructivism:**

- Learning is a search for meaning. Therefore, learning must start with the issues around which students are actively trying to construct meaning.
- Meaning requires understanding wholes as well as parts and parts must be understood in the context of wholes. Therefore, the learning process focuses on primary concepts, not isolated facts.
- In order to teach well, we must understand the mental models that students use to perceive the world and the assumptions they make to support those models.

The purpose of learning is for an individual to construct his or her own meaning, not just

memorize the "right" answers and repeat someone else's meaning. Since education is inherently interdisciplinary, the only valuable way to measure learning is to make assessment part of the learning process, ensuring it provides students with information on the quality of their learning.

How Constructivism impacts learning:

- Curriculum - Constructivism calls for the elimination of a standardized curriculum. Instead, it promotes using curricula customized to the students' prior knowledge. Also, it emphasizes hands-on problem solving.
- Instruction - Under the theory of constructivism, educators focus on making connections between facts and fostering new understanding in students. Instructors tailor their teaching strategies to student responses and encourage students to analyze, interpret and predict information. Teachers also rely heavily on open-ended questions and promote extensive dialogue among students.
- Assessment - Constructivism calls for the elimination of grades and standardized testing. Instead, assessment becomes part of the learning process so that students play a larger role in judging their own progress.

### **Check your Progress-2**

1. What is meant by measurement?

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2. Describe important level of measurement.

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3. Enumerate the different types of measurements.

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## **1.7 CLASSIFICATION OF ASSESSMENT**

There are three types of assessment: diagnostic, formative and summative. Although there are three, they are generally referred to simply as assessment, there are distinct differences between the three.

### **1.7.1 Prognostic Assessment**

A prognostic assessment expands the findings of an assessment with analysis of abilities and potentials with a further dimension: the future development of the concerned person, as well as the necessary conditions, timeframe and limits.

Finding the right person for an executive position needs a reliable comprehension of the personality as well as the possibilities and limits concerning the personal development. Even an experienced and keen observer of human nature may get deluded, even recognized and proven test procedures may be incomplete or leading to wrong results – and misjudgments can become expensive in substantial and immaterial ways.

#### **Six Goals of the Prognostic Personality and Abilities Assessment**

Analysis of existing abilities and interests, including the not (yet) known ones and the development to be expected.

- If needed, a comparison with job description and profile of requirements.
- Basic conditions and needs for the development: how it can be enhanced and ensured.
- Period: how long the development will take until the defined goals can be reached.
- Limits of developmental possibilities, either referring to the defined goals (selection assessment), or generally, with a realistic time frame of 3 to 5 years.
- Quality assurance and sustainability: how the results can be monitored and ensured in the long term.

The prognostic assessment is suitable for all management levels including executive board and administrative council, but likewise for young people with the aim of a comprehensive potential analysis. Typically, the prognostic assessment is accomplished as an individual one-day-assessment. The objectives are defined individually.

### **1.7.2 Formative Assessment**

Formative assessment provides feedback and information during the instructional process, while learning is taking place, and while learning is occurring. Formative assessment measures student progress but it can also assess your own progress as an instructor. A primary focus of formative assessment is to identify areas that may need improvement. These assessments typically are not graded and act as a gauge to students' learning progress and to determine teaching effectiveness (implementing appropriate methods and activities).

#### **❖ Types of Formative Assessment:**

- Observations during in-class activities
- Homework exercises as review for exams and class discussions
- Reflections journals that are reviewed periodically during the semester
- Question and answer sessions, both formal—planned and informal—spontaneous
- Conferences between the instructor and student at various points in the semester
- In-class activities where students informally present their results
- Student feedback collected by periodically

#### **❖ Diagnostic Assessment:**

Diagnostic assessment can help you identify your students' current knowledge of a subject, their skill sets and capabilities, and to clarify misconceptions before teaching takes place. Knowing students' strengths and weaknesses can help you better plan what to teach and how to teach it.

#### **➤ Types of Diagnostic Assessments:**

- Pre-tests (on content and abilities)
- Self-assessments (identifying skills and competencies)
- Discussion board responses (on content-specific prompts)
- Interviews (brief, private, 10-minute interview of each student)

### **1.7.3 Summative Assessment**

Summative assessment takes place after the learning has been completed and provides information and feedback that sums up the teaching and learning process. Typically, no more

formal learning is taking place at this stage, other than incidental learning which might take place through the completion of projects and assignments.

### **Types of Summative Assessment**

- Examinations (major, high-stakes exams)
- Final examination (a truly summative assessment)
- Term papers (drafts submitted throughout the semester would be a formative assessment)
- Projects (project phases submitted at various completion points could be formatively assessed)
- Portfolios (could also be assessed during its development as a formative assessment)
- Performances
- Student evaluation of the course (teaching effectiveness)
- Instructor self-evaluation

## **1.8 SCOPE**

### **1.8.1 Teacher-Made vs. Standardized Assessments**

In the broadest sense, assessments may be classified into two categories: teacher-made and standardized. Teacher-made assessments are constructed by an individual teacher or a group of teachers in order to measure the outcome of classroom instruction. Standardized assessments, on the other hand, are commercially prepared and have uniform procedures for administration and scoring. They are meant for gathering information on large groups of students in multiple settings (Karmel and Karmel, 1978). The same has been explained in detail in Chapter III.

## **1.9 ATTRIBUTE MEASURED**

### **a. Achievement**

Academic performance should be measured in multiple manners and methods such as: teacher observation, benchmark assessments, student portfolios, rubrics, progress monitoring tools, standardized assessments and other local assessments. “Using multiple assessments helps educators determine what is working and not working... and eventually can lead to better outcomes for students.”



## **b. Aptitude**

The terms intelligence, ability and aptitude are often used interchangeably to refer to behaviour that is used to predict future learning or performance. However, slight differences exist between the terms. The tests designed to measure these attributes differ in several significant ways.

### ➤ **How can one be improve Aptitude?**

Although studies seem to suggest that aptitude test scores cannot be improved, other research shows that that may not be the case. Tests such as the Scholastic Aptitude Tests contain many questions that are content-specific, particularly in math areas. Performance on these specific types of items is trainable.

Some experts feel that short-term cramming might not affect aptitude test scores. However, long-term instruction in broad cognitive skills might improve general test performance. Cognitive theory and research suggest that learning ability can be improved by training students in learning strategies. Improving academic aptitude may be possible through a systematic curriculum that complements direct training in learning strategies with both the development of general thinking approaches and the application of those approaches over a variety of different tasks and content areas.

What has been learned about training to improve aptitude can be summarized as follows:

- \* Attempts to train aptitude must go well beyond practice and feedback. What's needed is intensive training in strategies involved in task performance along with higher level monitoring and control strategies involved in guiding performance and in transferring skills to new areas.

- \* Educational efforts to improve aptitude need to be long-term.

- \* Abilities of students and methods of training interact. Attempts to train strategies must fit the tested aptitudes of students.

- \* Practice and feedback can be effective when students are already proficient in the ability to be trained.

\* Intrusive training may be harmful to high aptitude students.

\* Training ability works best when treatment utilizes some of the student's other strengths.

\* Some aspects of intellectual aptitude may be more easily trained than others.

### c. Attitude

Most simply put, attitudes are likes and dislikes. Social psychologists have given various definitions of the concept. Most of them view attitudes as inclinations or predispositions. According to **Gordon W Allport** defined an attitude to be a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related. **Milton Rokeach** defined it as a relatively enduring organization of beliefs around an object or situation predisposing a person to respond in some preferential manner.

Our response to an object is often in line with what we believe about and how we feel toward that object. Attitudes are, thus, said to have a knowledge/belief (cognitive) component, an emotional or affective component and a Conative or behavioral component.

Having an idea or belief about the object is the minimum condition for having an attitude with regard to it. When the object of which you have an idea becomes associated with pleasant or unpleasant events or with your aspirations and goals, you attach a corresponding affect or an emotional tinge to that object. This *affected* belief energizes and directs your response with regard to the object. *An attitude may thus be understood as an idea or belief charged with emotion predisposing an individual to act in a particular way to persons, things, situations, issues, etc.*

## 1.10 NATURE OF INFORMATION GATHERED (QUALITATIVE & QUANTITATIVE)

Research methods are split broadly into quantitative and qualitative methods.

### **a. Quantitative Research**

Quantitative research is perhaps the simpler to define and identify. The data produced are always numerical, and they are analysed using mathematical and statistical methods. If there are no numbers involved, then it's not quantitative research. Some phenomena obviously lend themselves to quantitative analysis because they are already available as numbers. Examples include changes in achievement at various stages of education, or the increase in number of senior managers holding management degrees. However, even phenomena that are not obviously numerical in nature can be examined using quantitative methods.

#### **Sources of Quantitative Data**

The most common sources of quantitative data include:

- **Surveys**, whether conducted online, by phone or in person. These rely on the same questions being asked in the same way to a large number of people;
- **Observations**, which may either involve counting the number of times that a particular phenomenon occurs, such as how often a particular word is used in interviews, or coding observational data to translate it into numbers; and
- **Secondary data**, such as company accounts.

Our pages on Survey Design and Observational Research provide more information about these techniques.

### **b. Qualitative Research**

Qualitative research is any which does not involve numbers or numerical data. It often involves words or language, but may also use pictures or photographs and observations. Qualitative analysis results in rich data that gives an in-depth picture and it is particularly useful for exploring **how** and **why** things have happened.

#### **Sources of Qualitative Data**

Although qualitative data is much more general than quantitative, there are still a number of common techniques for gathering it. These include:

- **Interviews**, which may be structured, semi-structured or unstructured;

- **Focus groups**, which involve multiple participants discussing an issue;
- **‘Postcards’**, or small-scale written questionnaires that ask, for example, three or four focused questions of participants but allow them space to write in their own words;
- **Secondary data**, including diaries, written accounts of past events, and company reports; and
- **Observations**, which may be on site, or under ‘laboratory conditions’, for example, where participants are asked to role-play a situation to show what they might do.

Our pages on Interviews for Research, Focus Groups and Observational Research provide more information about these techniques.

## 1.11 MODE OF RESPONSE

### a. Oral Response and Written Assessments

Student oral responses are longer and more complex, parallel to extended written response questions. Just as with extended written response, one evaluates the quality of oral responses using a rubric or scoring guide. Longer, more complicated responses would occur, for example, during oral examination or oral presentations. Written assessments are activities in which the student selects or composes a response to a prompt. In most cases, the prompt consists of printed materials (a brief question, a collection of historical documents, graphic or tabular material, or a combination of these). However, it may also be an object, an event, or an experience. Student responses are usually produced “on demand,” i.e., the respondent does the writing at a specified time and within a fixed amount of time. These constraints contribute to standardization of testing conditions, which increases the comparability of results across students or groups (a theme that is explored later in Chapters Four and Five).

### b. Selected-Response Tests

#### Characteristics

Selected-response tests are so named because the student reads a relatively brief opening statement (called a *stem*) and selects one of the provided alternatives as the correct answer. Selected-response tests are typically made up of multiple-choice, true-false, or matching items. Quite often all three item types are used in a single test. Selected-response tests are sometimes

called "objective" tests because they have a simple and set scoring system. If alternative (b) of a multiple-choice item is keyed as the correct response and the student chose alternative (d), the student is marked wrong, regardless of how much the teacher wanted the student to be right.

### **Advantages**

A major advantage of selected-response tests is efficiency -- a teacher can ask many questions in a short period of time. Another advantage is ease and reliability of scoring. With the aid of a scoring template (such as a multiple-choice answer sheet that has holes punched out where the correct answer is located), many tests can be quickly and uniformly scored.

### **Disadvantages**

Because items that reflect the lowest level of Bloom's Taxonomy (verbatim knowledge) are the easiest to write, most teacher-made tests are composed almost entirely of knowledge-level items (a point we made initially in Chapter 7). As a result, students focus on verbatim memorization rather than on meaningful learning. Another disadvantage is that, while we get some indication of what students know, such tests tell us nothing about what students can do with that knowledge.

## **c. Supply - Response Tests**

### **i. Fill –in-the- Blank**

Fill –in-the- Blank with a word bank is just another form of matching and only test the lower cognitive levels.

### **Rules**

**Rule I:** Position in the blank at the end of the statement.

Poor Item

A ----- is used to keep food cold.

Better Item

To keep food cold use a -----

**Rule II:** Limit the number of blanks in a statement.

Poor Item

A ----- sends -----of electrical current through -----.

Better Item

Pulses of electrical current are sent through wire by a (n) -----

**Rule III:** Keep blanks the same length

Poor Item

American flag is composed of ----- and -----.

Better Item

American flag is composed of ----- and -----.

## **ii. Short-Answer Tests**

### **Characteristics**

Instead of selecting from one or more alternatives, the student is asked to supply a brief answer consisting of a name, word, phrase, or symbol. Like selected-response tests, short-answer tests can be scored quickly, accurately and consistently, thereby giving them an aura of objectivity. They are primarily used for measuring foundational knowledge.

### **Advantages**

Short-answer items are relatively easy to write, so a test, or part of one, can be constructed fairly quickly. They allow for either broad or in-depth assessment of foundational knowledge since students can respond to many items within a short space of time. Since students have to supply an answer, they have to recall, rather than recognize, information.

### **Disadvantages**

This item type has the same basic disadvantages as the selected-response items. Because these items ask only for short verbatim answers, students are likely to limit their processing to that level, and these items provide no information about how well students can use what they have learned. In addition, unexpected but plausible answers may be difficult to score.

### **iii. Essay Tests**

#### **Characteristics**

The student is given a somewhat general directive to discuss one or more related ideas according to certain criteria. One example of an essay question is "Compare operant conditioning theory and information-processing theory in terms of basic assumptions, typical research findings, and classroom applications".

#### **Advantages**

Essay tests reveal how well students can recall, organize, and clearly communicate previously learned information. When well written, essays tests call on such higher-level abilities as analysis, synthesis, and evaluation. Because of these demands, students are more likely to try to meaningfully learn the material over which they are tested.

#### **Disadvantages**

Consistency of grading is likely to be a problem. Two students may have essentially similar responses, yet receive different letter or numerical grades. These test items are also very time consuming to grade. And because it takes time for students to formulate and write responses, only a few questions at most can be given.

#### **Formative vs. Summative Evaluation:**

Formative evaluation involves "collecting, synthesizing and interpreting data for the purpose of improving learning or teaching (Airasian, 1997, p. 402). Thus, formative assessments support learning and are not graded. "Rather, they serve as practice for students, just like a meaningful homework assignment" (Dodge, 2011) and can provide valuable information to teachers for improving student performance. Summative evaluations, on the other hand, "are given periodically to determine at a particular point in time what students know and do not know . . ." (Garrison and Ehringhaus, 2007). They are often used for assigning grades.

### **1.12 NATURE OF INTERPRETATION**

#### **Norm-Referenced, Criterion-Referenced and Standards-Referenced Frameworks**

- **Standardized assessments** may be norm-referenced, criterion referenced, or standards referenced.

- **Norm-referenced assessments** compare individual scores to those of a norm-reference group, generally students of the same grade or age. They are designed to demonstrate "differences between and among students to produce a dependable rank order" (Bond, 1996, p.1) and are often used to classify students for ability-grouping or to help identify them for placement in special programs. They are also used to provide information to report to parents.
- **Criterion-referenced assessments** determine the specific knowledge and skills possessed by a student. In other words, identify "the kind of performances a student can do in a domain, rather than the student's standing in a norm group" (Nitco and Brookhart, 2011, p. 369). Standards-based assessments involve comparing students' scores to "clearly defined levels of achievement or proficiency" (Nitco and Brookhart, 2011, p. 514), such as state or national standards.
- **Self-Reference** occurs in natural or formal languages when a sentence, idea or formula refers to itself. The reference may be expressed either directly through some intermediate sentence or formula or by means of some encoding. It is studied and has applications in mathematics, philosophy, computer programming and linguistics. Self-referential statements are sometimes inconsistent. Self-referenced feedback (i.e. information on improvement or decline by comparing student achievement with his or her own past achievement) has been recommended in the assessment reform.

### 1.13 CONTEXT (INTERNAL AND EXTERNAL)

Internal assessment is set and marked by the school (i.e. teachers). Students get the mark and feedback regarding the assessment. External assessment is set by the governing body, and is marked by non-biased personnel. Some external assessments give much more limited feedback in their marking.

The students' performances are measured periodically in different context during the period of the course. Student's performance in slip tests, weekly tests, monthly tests with behaviour are being taken into account besides assignments and project work while calculating the internal mark. At the same time, the performance of the students at the end of the course has been measured which is called as external. In other way it is called as formative and Summative evaluation.



**Check your Progress-4**

4. What is meant by measurement?

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5. Describe important level of measurement.

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6. Enumerate the different types of measurements.

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**1.14. LET US SUM UP**

So far you have learnt the Meaning of Assessment as the term Assessment has been widely used by educators to evaluate, measure, and document the academic readiness, learning progress, and skill acquisition of students throughout their learning in life. You have also understood the difference and interrelationships in meaning between Measurement, Test, Examination, Appraisal and Evaluation. There are different principles of Assessments such as Validity, Reliability, Relevance and transferability. It is understood that learner centeredness, Teacher-Directed, Mutually Beneficial, Formative Assessment, Context-Specific, Ongoing and Rooted in Good Teaching Practice are some of the characteristics of classroom assessment.

You have also learnt certain Learning theories such as Behaviorist, Cognitivist and Constructivist and its impact on learning. Further you have seen the different developmental stages like Sensorimotor, Preoperational, Concrete operations and Formal operations. It is also understood that Behaviorism is a philosophy of learning that only focuses on objectively observable behaviors and discounts mental activities. At the same time, Constructivism is a philosophy of learning founded on reflecting on our experiences we construct our own understanding of the world we live in. You have also learnt the different classifications of

Assessments such as purpose, scope, attribute measured, Nature of Information gathered, Mode of Response, Nature of Interpretation and Context.

### **1.15 ANSWERS TO ‘CHECK YOUR PROGRESS’**

1. Assessment is carried out to see what children and young people know, understand and are able to do.
2. Assessment is the systematic collection, review, and use of information about educational programs undertaken for the purpose of improving student learning and development.
3. Formulating Statements of Intended Learning Outcomes, Developing or Selecting Assessment Measures, Creating Experiences Leading to Outcomes and Discussing and Using Assessment Results to Improve Teaching and Learning.
4. a).Standards-Referenced or Standards-Based Assessments b). Performance Assessments c). Portfolio-Based Assessments and d). Common Assessments
5. Summative assessments are used to evaluate student learning at the conclusion of a specific instructional period-typically at the end of a unit, course, semester, program or school year.
6. Standardized assessments are designed, administered, and scored in a standard or consistent manner. They often use a multiple-choice format, though some include open-ended, short-answer questions.
7. System and school accountability, Teacher evaluation and compensation, Instructional improvement and Learning-needs identification
8. Assessments give teachers in-process feedback on student learning, which can help them make instructional adjustments during the teaching process, instead of having to wait until the end of a unit or course to find out how well students are learning the material.
9. Measurement is the assignment of a number to a characteristic of an object or event, which can be compared with other objects or events.
10. It helps one decide how to interpret the data from that variable and decide what statistical analysis is appropriate on the values that were assigned.
11. Nominal Measurement, Ordinal Measurement, Interval Measurement and Ratio Measurement

### 1.16 UNIT END EXERCISES

- Describe the meaning of Assessment
- Give the different definitions of Assessment
- What are the Components of Assessment
- Explain the different types of Assessment followed in schools
- Describe the different designs of Assessment
- How assessment will improve the teachers and schools?
- Explain the meaning of Measurement.
- What are the Components of level of Measurement?
- Explain the important level of Measurement and types of Measurement.

### 1.17. SUGGESTED READINGS

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## **UNIT – II**

### **CHARACTERISTICS OF INSTRUMENTS OF ASSESSMENT**

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#### **STRUCTURE**

##### **2.1. INTRODUCTION**

##### **2.2. LEARNING OBJECTIVES**

##### **2.3 EVALUATION**

##### **2.4 CHARACTERISTICS OF INSTRUMENTS OF EVALUATION**

###### **2.4.1 Validity**

###### **2.4.2 Reliability**

###### **2.4.3 Relationship between Validity and Reliability**

##### **2.5 OBJECTIVITY**

##### **2.6 USABILITY**

##### **2.7 PRACTICABILITY**

##### **2.8 MEASURABILITY**

##### **2.9 NORMS**

##### **2.10 EDUCATIONAL OBJECTIVES**

###### **2.10.1 Functions of Educational objectives**

###### **2.10.2 Structure of the Knowledge Dimension of the Revised Taxonomy**

##### **2.11 ASSESSMENT METHODS**

###### **2.11.1 Selected Response**

###### **2.11.2 Extended Written Response**

###### **2.11.3 Performance Assessment**

###### **2.11.4 Personal Communication**

##### **2.12 ASSESSMENT TECHNIQUES**

###### **2.12.1 Advantages of Using Assessment Techniques**

###### **2.12.2 Teacher Assessment**

###### **2.12.3 Benefits to Students**

##### **2.13 SELECTION OF TECHNIQUES**

###### **2.13.1 Techniques Which Assess Prior Knowledge, Recall, and Understanding**

###### **2.13.2 Techniques Which Assess Skill in Synthesis and Creative Thinking**

###### **2.13.3 Techniques Which Assess Skill in Application and Performance**

###### **2.13.4 Analytic Memo of Assessing Skill in Analysis and Critical Thinking**

##### **2.14 LET US SUM UP**

##### **2.15 ANSWERS TO ‘CHECK YOUR PROGRESS’**

##### **2.16 UNIT END EXERCISES**

##### **2.17 SUGGESTED READINGS**

## **2.1. INTRODUCTION**

The term **Assessment** has been widely used by educators to evaluate, measure and document the academic readiness, learning progress, and skill acquisition of students throughout their learning in life. Different terminologies are there for assessment and evaluation such as Measurement, Tests, Examination, Appraisal and Evaluation. There are certain Learning theories which are having conceptual frameworks describing how information is absorbed, processed and retained during learning. Behaviourism is a philosophy of learning that only focuses on objectively observable behaviors and discounts mental activities. Piaget proposed that a child's cognitive structure increases in sophistication with development, moving from a few innate reflexes such as crying and sucking to highly complex mental activities. Constructivist learning theory stated that the process of adjusting our mental models to accommodate new experiences. Assessments are classified based on the different purposes, scopes, attribute measured, nature of information gathered, nature of interpretation and context.

## **2.2 LEARNING OBJECTIVES**

After learning this unit, you will be able to

- Describe the meaning Assessment and different evaluations
- State the purposes, principles and characteristics of quality assessment
- Bring out the specialty of different learning theories like Behaviorist, Cognitivist and Constructivist of
- Classify the assessment based on purpose, scope, attribute measured, nature of information gathered, nature of interpretation and context

## **2.3 EVALUATION**

Evaluation is a series of activities that are designed to measure the effectiveness of the teaching learning as whole process. It is the assessment of systematic planned and quality learning. It helps the teacher to make better judgments in various aspects. So it is important and continuous component. For this purpose we need variety of evaluating tools.

## **2.4 CHARACTERISTICS OF INSTRUMENTS OF EVALUATION**

It is important that instruments of measurement used for research purposes should be properly standardized. Individual score can be compared with the scores of others in a defined group. The evaluation tools serve a variety of uses. Selecting a proper tool is the base for accurate result of evaluation. An evaluation tool may be defined as a sophisticated means of intelligently and scientifically designed to evaluate what is required. Regardless of the type of tool used or how the results of evaluation are to be used, all types of evaluation should possess certain characteristics. The most important characteristics are validity, reliability, objectivity and usability.

### **2.4.1 Validity**

Validity is the quality of data gathering instrument which enables to measure what it is supposed to measure. Validity refers to the degree to which the test actually measures what it claims to measure. Validity is also the extent to which inferences, conclusions and decisions made on the basis of test scores are appropriate and meaningful. Validity also refers to whether or not a test measures what it intends to measure. A test with high validity has items closely linked to the test's intended focus. A test with poor validity does not measure the content and competencies it ought to. Validity encompasses the entire experimental concept and establishes whether the results obtained meet all of the requirements of the scientific research method. A quality of a measurement indicating the degree to which the measure reflects the underlying construct, that is, whether it measures what it purports to measure.

#### **a. Different Methods of Validity**

Sometimes validity is also thought as utility. Basic to validity of a tool is to measure the right thing or asking right questions. The items of a questionnaire, inventory must appropriately sample a significant aspect of the purpose of the investigation. Validity is not absolute characteristic; it depends on purpose and method used. The six categories of validity are content validity, construct validity, criterion-related validity, concurrent validity, predictive validity and face validity.

### **i. Content Validity**

Content validity refers to the connections between the test items and the subject-related tasks. It is judged by the degree of relationship between diagnostics techniques and achievements in curriculum. The content validity of academic achievement test in subjects is examined by checking the test items against the complete courses of study. The test should evaluate only the outline of the content related to the field of study in a manner sufficiently representative, relevant, and comprehensible. Based on the outline of the content indicating the kinds of knowledge and abilities which the students answer correctly. The overall judgment is based on the extent of agreement between the test and the instructional plan.

### **ii. Construct Validity**

Construct validity is the relationship between the results of a technique of measurement and other indicators of the characteristics that are measured. It implies using the construct (concepts, ideas, and notions) in accordance to the state of the art in the field. Construct validity seeks agreement between updated subject-matter theories and the specific measuring components of the test. This type of validation is often used for measures of a psychological characteristic that is assumed to exist by empirical or theoretical deduction. The general mental ability comprises independent factors such as verbal ability, number ability, perceptual ability, special ability, reasoning ability and memory ability. In order to establish the construct validity of a test, it may be necessary to correlate the results of other tests.

### **iii. Criterion-Related Validity**

It referred to as instrumental validity; it is used to demonstrate the accuracy of a measure or procedure by comparing it with another process or method which has been demonstrated to be valid. For example, imagine a hands-on driving test has been proved to be an accurate test of driving skills. A written test can be validated by using a criterion related strategy in which the hands-on driving test is compared to it

### **iv. Concurrent Validity**

Concurrent validity refers to the usefulness of a test in closely relating to measures or scores on another test of known validity. Tests are validated by comparing their results with a test of known validity. Concurrent validity indicates the relationship between a measure and

more or less immediate behavior or performance of identifiable groups. Concurrent validity is considered when any test is used for the purpose of distinguishing between two or more groups of individuals whose status at the time of testing is different. Concurrent validity is used for statistical methods of correlation to other measures. Once the tests have been scored, the relationship between the examinees' status and their performance (i.e., pass or fail) is estimated based on the test.

#### **v. Predictive Validity**

Predictive validity refers to the usefulness of a test in predicting some future performance. Predictive validity is measured by the degree of relationship between a measured and subsequent criteria measure of judgments. This type of validity is used in tests of intelligence, test of aptitudes, vocational interest inventories and projective techniques. This type of validity is especially useful for test purposes such as selection or admissions.

#### **vi. Face Validity**

Face validity is the characteristics which appear to measure those which are actually sought to be measured. It determined by a review of the items and not through the use of statistical analyses. Unlike content validity, face validity is not investigated through formal procedures. Instead, anyone who looks over the test, including examinees, may develop an informal opinion as to whether or not the test is measuring what it is supposed to measure. Face validity is not however suitable measure of validity, sometimes it might be misleading.

### **b. Factors Affecting the Validity**

The factors which influences the validity are

- Factors in the test itself
- Factors in test administration and scoring
- Factors of pupil response
- Nature of group

#### **i. Factors in the Test Itself**

Each test consists of number of items with close scrutiny. Tests the subject matter content only. Some factors lower the validity. The unclear direction, complicated vocabulary,



inappropriate level of difficulty, poorly constructed test items, misinterpretation, test is too short and improper arrangement of items.

## **ii. Factors in Test Administration and Scoring**

The test administration and scoring procedures may affect the interpretation of the results. Teacher made test or standardized test are conducted during the adverse physical and psychological conditions, it may affect the validity.

## **iii. Factors of Pupil Response**

The economically disturbed students, lack of student's motivation and student's fear of test situation may ultimately affect the validity.

## **iv. Nature of Group**

Validity is always specific to a particular group to be measured. The nature of criterion used is age, sex, ability level, educational and cultural background influences the validity.

### **Check your Progress-1**

4. Explain the term Evaluation.

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5. What are most important characteristics of Evaluation?

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6. State the different categories of Validity.

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### **2.4.2 Reliability**

Reliability refers to the consistency of measurement, that is, how consistent are evaluation results from one measurement to another. Reliability is concerned with the extent to which an evaluation test is consistent in measuring what it is intended to measure. If the measurements are not consistent over different occasions or over different samples of the same performance domain, the evaluator can have little confidence in the results.

A test scores would be reliable when there is good reason to believe that it is stable and trust worthy. These characteristics will depend on the extent to which the score is free from chance error. It is to be expected that the same test which is repeatedly administered on the same group of individuals, should yield the same pattern of scores.

#### **a. Different Methods of Reliability**

The various methods of estimating reliability are explained as follows

##### **i. Test-Retest Method**

In this test, the same tool or instrument is administered to the same sample on two different occasions. The resulting test scores are correlated and the correlation coefficient provides a measure of stability over a given period of time. If the results are highly stable, those respondents who are high on one administration of test will also be high on the other administration and the other respondents tend to remain in their same relative positions on both administrations. An important factor to be kept in mind is the time interval between tests when interpreting measures of stability. If the time interval is short (say 1-2 days), the consistency of results will be inflated because respondents will remember some of their answers from the first test. If the time interval is quite long (say 1 year), the results will be influenced by the actual changes in the respondent over that period of time. Therefore, the best time interval between test administrations will mainly depend on the use to be made of results.

##### **ii. Equivalent-Forms Method**

This method uses two versions of an instrument given to the same sample of respondents. The two forms of the instrument are administered to the same group of respondents in close succession, and the resulting scores are correlated. The correlated coefficient provides a measure

of equivalence. It indicates the degree to which both forms of the test are measuring the same aspects of behaviour. The equivalent forms method reflects short term constancy of respondents' performance and the extent to which the test represents an adequate sample of the characteristics being measured.

### **iii. Split-Half Method**

Reliability is also estimated from a single administration of a single form of a test. The test is administered to a group of respondents in the usual manner and then is divided in halves for scoring purposes. To split the test into halves that are most equivalent, the usual procedure is to score the even numbered and the odd numbered items separately. This produces two scores for each respondent, which, when correlated, provide a measure of internal consistency. A reliability coefficient is determined by correlating the scores of two half-tests. The split half method is similar to the equivalent forms method in that it indicates the extent to which the sample of test items is a dependable sample of the content being measured. A high correlation between the scores on the two-halves of a test denotes the equivalence of the two-halves and consequently the adequacy of the sampling. The advantage of this method is that all data for calculation of the reliability coefficient can be collected in one sitting thereby avoiding variations due to two sessions.

### **iv. Kuder-Richardson Method**

Another method of estimating the reliability of test scores from a single administration of a single form of a test is by means of formulas developed by Kuder and Richardson. These formulas provide a measure of internal consistency as with the split-half method but do not require splitting the test in halves for scoring purposes. Kuder-Richardson estimates of reliability provide information about the degree to which the items in the test measure similar characteristics. For a test with relatively homogeneous content, the reliability estimate generally will be similar to that provided by the split half method. In fact, Kuder-Richardson estimate can be thought of as an average of all of the possible split half coefficients for the group tested. It is an advantage when considering tests with relatively homogenous content since the estimate does not depend on the way in which the items are confined to the two half test as in the split-half method. However, for tests designed to measure more heterogeneous learning outcomes, the

Kuder-Richardson estimate will be smaller as compared to split half method and the later method is to be preferred.

### **2.4.3 Relationship between Validity and Reliability**

Validity and reliability are closely related. A test cannot be considered valid unless the measurements resulting from it are reliable. Likewise, results from a test can be reliable and not necessarily valid. Test validity is requisite to test reliability. If a test is not valid, then reliability is moot. In other words, if a test is not valid there is no point in discussing reliability because test validity is required before reliability can be considered in any meaningful way. Likewise, if a test is not reliable it is also not valid. Therefore, the two studies do not examine reliability.

At the same time, the evaluation results cannot be perfectly consistent. There are many factors that influence the results. If a single test is administered to the same group twice in a close succession, some variations in the scores can be expected because of temporary fluctuations in memory, attention, effort, fatigue and guessing etc. Variation in scores can occur due to intervening learning experiences if long time gap exists between two tests. Such extraneous factors introduce certain amount of measurement error in all types of evaluation. The method of determining reliability is, in fact, the means of determining the measurement error under different conditions. Methods of estimating reliability involve comparing at least two applications of the same instruments or equivalent instruments and determining the extent to which they agree. The closer the agreement, the greater is the reliability.

## **2.5 OBJECTIVITY**

Objectivity is a central philosophical concept, related to reality and truth, which has been variously defined by sources. Generally, objectivity means the state or quality of being true even outside of a subject's individual biases, interpretations, feelings and imaginings. A proposition is generally considered objectively true (to have objective truth) when its truth conditions are met and are "bias-free"; that is, existing without biases caused by, feelings, ideas, etc. of a sentient subject. A second, broader meaning of the term refers to the ability in any context to judge fairly, without bias or external influence; this second meaning of objectivity is sometimes used synonymously with neutrality.

**a. High objectivity tests**

Standardized group tests have high objectivity because they are provided with scoring keys. For example intelligence, achievement, attitude and aptitude tests. These tests have certain standard answers.

**b. Moderate objectivity**

Binet and Wechsler Bellevue intelligence test administered individually have moderate objectivity. The evaluation techniques Rorschach and Thematic Appreciation test also have moderate objectivity. The results obtained from test or other evaluative techniques require interpretation. The raw scores on a standardized test becomes much more meaningful when compared with average score obtained by reference groups arranged according to age, grade, years of study and type of person.

**Check your Progress-2**

7. Define Reliability.

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8. Mention the different methods of Reliability.

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9. What do you mean by Objectivity?

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**2.6 USABILITY**

While selecting evaluation tool / instrument, practical considerations need to be kept in mind. Generally, the tests are administered by teachers having very limited training. The time available for testing is also limited. The cost of testing is also taken into consideration. All these factors must be taken into account when selecting evaluation tools.

**a. Ease of Administration**

Ease of administration is an important aspect if the evaluation instrument or test is to be administered by persons with limited training. For this, it is to be kept in mind that the questions asked are few in numbers. The time provided should be sufficient and the directions should be simple and clear, otherwise, persons who are not properly trained in administering tests may err in giving directions as to how to fill the test. This can have an adverse effect on the validity and reliability of test score.

**b. Appropriate Time for Administration**

The time provided for administering a test should be appropriate. If an attempt is made to cut down too much on the time allotted to testing, the reliability of the test score may reduce drastically. A safe procedure is to allot as much time as is necessary to obtain valid and reliable results.

**c. Ease of Interpretation of Results**

The success of an evaluation is determined by the use made of the evaluation results. If they are interpreted correctly, they will contribute effectively in decision-making process. If the results are misinterpreted, they will be of little value. Therefore, ease of interpretation of evaluation results is important, when the results are to be presented.

**d. Cost of Administering Tests**

The cost of administering test should not be a major consideration as it is comparatively inexpensive. However, in large-scale testing programs, use of separate answer sheets, machine scoring and reusable booklets can reduce the cost appreciably.

**2.7 PRACTICABILITY**

Practicability should be feasible and usable. Quality of being usable in context to the objective to be achieved. The qualities of practicability in a test involve factors such as cost, administration, scoring method, mode of interpretation, time and availability of tests. The tests must inspire a feeling of reality and purpose. The physical appearance of the test should be as attractive and interesting as is feasible.

**a. Cost**

Tests that can be given in a short period of time are likely to gain the cooperation of the subjects and to conserve the time of all those involved in test administration. Teachers should examine the quality of highest quality and that may be obtained within the budget.

**b. Administration**

The use of any test should be judged in terms of the related competencies of the personnel. Tests that are interesting and enjoyable help to gain the cooperation of the subject. Those are dull or seem silly may discourage the subject. Under these unfavorable conditions, the test is not likely to yield useful results.

**c. Scoring Method**

Intelligence and personality tests require expertly trained personnel. Test should be reviewed carefully to determine practicability.

**d. Mode of Interpretation**

The tests such as personality, attitudes, aptitudes and interest should be interpreted with validity. The manual of tests should be studied carefully to determine the feasibility of interpretation of results. Test scores and result must be amenable for interpretation by the researchers objectivity and uniformly.

**e. Time**

Suitable short test rather than a longer and more comprehensive one which gives more valid and reliable results. Several short tests will give more complete description of the individual .The length of a test has an important effect upon cooperation interest and effort of the examiner.

**f. Availability of Tests**

It is essential that parallel forms of the test be available for administration before and after a particular period of time. Therefore, the quality of each item should be important.

## **2.8 MEASURABILITY**

The quality of being capable of being rated or estimated it should measure the objective to be achieved.

## **2.9 NORMS**

It is a preliminary test for comparing achievement of an examinee to a large group of examinees at the same grade. The representative group is known as Norm group. Norm-referenced test is a test design to provide a measure of performance that is interpretable in terms of an individual's relative standing in some known group. Norm group may be made up of examinees at the local level, district level, state level or national level. Since the development of norm-referenced tests is expensive and time consuming.

Bormuth (1970) writes that Norms is to measure the growth in a student's attainment and to compare his level of attainment with the levels reached by other students and norm group.

### **a. Characteristics of a Norm**

- Its basic purpose is to measure student's achievement in curriculum based skills.
- It is prepared for a particular grade level.
- It is administered after instruction.
- It is used for forming homogeneous or heterogeneous class groups.
- It classifies achievement as above average, average or below average for given grade.
- It is generally reported in the form of Percentile Rank, Linear Standard Score, Normalized Standard Score and grade equivalent.

### **b. Merits of Norms**

- ❖ To make differential predictions in aptitude testing.
- ❖ To get a reliable rank ordering of the pupils with respect to the achievement
- ❖ To identify the pupils who have mastered the essentials of the course more than others.
- ❖ To select the best of the applicants for a particular programme.
- ❖ To find out how effective a programme is in comparison to other possible programmes.

### **c. Demerits of Norms**

- ❖ Test items answered by the students are not included in these test items because of their inadequate contribution to response variance.



- ❖ There is lack of congruence between what the test measures and what is stressed in a local curriculum.
- ❖ This promotes unhealthy competition and injurious to self-concepts of low scoring students.

Norm-referenced measurement is the traditional class based assignment. The measurement act relates to some norm, group or a typical performance. It is an attempt to interpret the test results in terms of performance of a certain group of students. So, this group is a norm group test scores. Thus norm-referenced test typically attempts to measure more general category of competencies.

### **Check your Progress-3**

10. What are the things need to be kept in mind while selecting evaluation tools?

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11. Bring out the qualities of practicability in a test.

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12. Give a note on 'Norm-referenced test'.

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## **2.10 EDUCATIONAL OBJECTIVES**

Educational objectives are not only the goals which shape the students towards instruction, it is also the basis for teaching activities and evaluation techniques. This is broad; outcomes are generalized and normative in nature. All schools may have common educational objectives. Educational objectives are to be realized over a extend period of time. It does not specify very sharply the learning outcomes.

### **2.10.1 Functions of Educational objectives**

- ❖ It provides the desired direction to educational activities.
- ❖ It determines the nature.
- ❖ It provides the basis for measurement.
- ❖ It helps the priorities to fix the goals

The knowledge dimension represents a range from concrete (factual) to abstract (Metacognitive). Representation of the knowledge dimension as a number of discrete steps can be a bit misleading. For example, all procedural knowledge may not be more abstract than all conceptual knowledge and Metacognitive knowledge is a special case. In this model, Metacognitive knowledge is knowledge of [one's own] cognition and about oneself in relation to various subject matters (Anderson and Krathwohl, 2001).

### **2.10.2 Structure of the Knowledge Dimension of the Revised Taxonomy**

#### **A. Factual Knowledge**

The basic elements that students must know to be acquainted with a discipline or solve problems in it.

- Knowledge of terminology
- Knowledge of specific details and elements

#### **B. Conceptual Knowledge**

The interrelationships among the basic elements within a larger structure that enable them to function together.

- Knowledge of classifications and categories
- Knowledge of principles and generalizations
- Knowledge of theories, models and structures

#### **C. Procedural Knowledge**

How to do something; methods of inquiry, and criteria for using skills, algorithms, techniques and methods.

- Knowledge of subject-specific skills and algorithms

- Knowledge of subject-specific techniques and methods
- Knowledge of criteria for determining when to use appropriate procedures

#### **D. Metacognitive Knowledge**

Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.

- Strategic knowledge
- Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge
- Self-knowledge

### **2.11 ASSESSMENT METHODS**

Throughout our school careers, both as students and as teachers, we have encountered thousands of different assessments. Although the variations are endless, all of the assessments we have experienced and give today fall into one of four basic categories of methods:

- Selected response and short answer
- Extended written response
- Performance assessment
- Personal communication

All four methods are legitimate options when their use correlates highly with the learning target and the intended use of the information.

#### **2.11.1 Selected Response**

Selected response and short answer methods consist of those in which students select the correct or best response from a list provided. Formats include multiple choice, true/false, matching, short answer and fill-in questions. (Although short answer and fill-in-the-blank do require students to generate an answer, they call for a very brief answer that is counted right or wrong, so we include these options in the selected response category.) For all selected response assessments, students' scores are figured as the number or proportion of questions answered correctly.

### **2.11.2 Extended Written Response**

Extended written response assessment requires students to construct a written answer in response to a question or task rather than to select one from a list. An extended written response is one that is at least several sentences in length. Examples include the following

- Compare pieces of literature, solutions to environmental problems, or economic events.
- Analyze artwork, forms of government or solutions to problems.
- Interpret music, scientific information or polling data.
- Solve a mathematics problem and show and explain all work.

Describe in detail a scientific, mathematical or economics process or principle, such as how supply and demand works. We judge correctness of extended written responses by applying one of two types of predetermined scoring criteria. One type gives points for specific pieces of information that are present.

### **2.11.3 Performance Assessment**

Performance assessment is a method of teaching and learning that involves both process and product. It is not just a testing strategy. Performance assessment tasks involve students in constructing various types of products for diverse audiences.

Performance assessment is assessment based on observation and judgment; we look at a performance or product and make a judgment as to its quality.

**Examples include the following:**

- Complex performances such as playing a musical instrument, carrying out the steps in a scientific experiment, speaking a foreign language, reading aloud with fluency, repairing an engine, or working productively in a group. In these cases it is the doing—the process—that is important.
- Creating complex products such as a term paper, a lab report, or a work of art in these cases what counts is not so much the process of creation (although that may be evaluated, too), but the level of quality of the product itself. As with extended written response assessments, performance assessments have two parts: a performance task or exercise and a scoring guide. Again, the scoring guide can award points for specific

features of a performance or product that are present, or it can take the form of a rubric, in which levels of quality are described.

#### **2.11.4 Personal Communication**

Gathering information about students through personal communication is just what it sounds like we find out what students have learned through interacting with them. Examples include the following:

- Looking at and responding to students' comments in journals and logs
- Asking questions during instruction
- Interviewing students in conferences
- Listening to students as they participate in class
- Giving examinations orally

We usually think of this as informal, rather than formal assessment. Often it is. However, as long as the learning target and criteria for judging response quality are clear, information gathered via personal communication can be used to provide descriptive feedback to students, for instructional planning, and for student self-reflection and goal setting. If planned well and recorded systematically, information from personal communication can be used as the basis for assessments of learning. Student responses are evaluated in one of two ways. Sometimes the questions we ask require students to provide a simple, short answer, and all we're looking for is whether the answer is correct or incorrect. This is parallel to scoring for written selected response questions. Questions during instruction usually call for this short answer oral responses. Other times, student oral responses are longer and more complex, parallel to extended written response questions. Just as with extended written response, we evaluate the quality of oral responses using a rubric or scoring guide. Longer, more complicated responses would occur, for example, during oral examination or oral presentations.

#### **2.12 ASSESSMENT TECHNIQUES**

Assessment is a formative rather than a summative approach to assessment. Its purpose is to improve the quality of student learning, not to provide evidence for evaluating or grading students. It provides faculty with feedback about their effectiveness as teachers and it gives students a measure of their progress as learners. The aim of assessments is to provide faculty with information on what, how much and how well students are learning. Such assessments are created, administered and analyzed by teachers themselves.

### **2.12.1 Advantages of using Assessment Techniques**

They are formative in nature. Unlike final exams or major term papers, Assessment Techniques provide faculty with feedback on student learning while the teaching/learning relationship is still intact, so that faculty can intervene during the semester (as opposed to the next semester) to help students learn more completely. They are speedy. They often consume just a few minutes of classroom time to administer, and can be read easily and quickly by faculty. They are flexible. They can be tailored to the unique and specific concerns of the instructor. They can be anonymous for students (although they need not be). The aim of classroom assessment is not necessarily to grade individual student work or to provide individual students with feedback on their performance; rather, the aim is to provide the instructor with feedback on student learning. Anonymity may prove useful in freeing students to express not only what they do understand but also what they do not understand.

### **2.12.2 Teacher Assessment**

Assessment helps faculty to focus on student learning. By determining what students have learned and what is unclear, instructors can focus the class more effectively to meet the learning needs of that group. This may mean reviewing some areas or spending less time in other areas. Unlike student evaluation surveys [summative evaluation] which are typically given at the end of the semester, Assessment provides an on-going formative evaluation. The instructor can find out what can be changed immediately to help students to learn.

### **2.12.3 Benefits to Students**

Students may be hesitant to ask questions. Assessments give students opportunities to provide anonymous feedback to their instructor about their learning. Students often discover, as the instructor reviews the feedback, that others in the class had similar questions. Assessment activities can themselves be positive learning activities for students; they can be developed both to promote writing skills or critical thinking skills, and to increase student motivation to take themselves and their learning more seriously. In addition, students may become more involved in their learning when they find that others in the class learned some interesting things that they had not picked up from the class session. Through greater involvement, students are likely to become more self-directed learners, and may be more motivated to successfully complete the class.

Assessment Techniques may be used in any type of class. Some techniques are for use in small groups; some are designed to check students' immediate understanding; others are for application and critical thinking.

These techniques are not new effective teachers have been using various methods for years to find out what students are learning or not learning. However, research on effective techniques to measure both students learning and teaching.

➤ **Student Involvement in Learning**

Students believe that Classroom Assessment contributes to greater involvement in learning because they are forced to think about what they have learned.

➤ **Faculty Development**

Classroom Assessment has helped many faculties re-think how they teach their classes. Classroom Assessment provides the input needed to learn more about what is working and what needs to be changed in their classes. Some faculty asks students to respond to a question at the end of every class meeting; some faculty integrates the assessments throughout each class meeting. Others use Classroom Assessments at the most critical points in the course, e.g., before a major exam or project. Some use assessments to evaluate the effectiveness of class activities or tests. Still others have used Classroom Assessment to help students to evaluate their own learning progress. The frequency and types of assessments used depend on the class, the teacher, and the reasons for assessing students' learning progress.

Anonymous feedback results in responses that are more candid. However, if the assessments are used in the form of homework assignments or small group activities within the class, anonymity is not possible. It is best to ask learner-centered questions rather than teacher-centered. The learner centered questions will show clearly whether or not the teaching is effective. Questions should be asked only if you really want to know the answer and are willing to respond to the feedback to meet student needs.

## **2.13 SELECTION OF TECHNIQUES**

1. Assessing Prior Knowledge, Recall, Understanding
2. Assessing Skill in Synthesis and Creative Thinking
3. Assessing Skill in Application and Performance
4. Assessing Skill in Analysis and Critical Thinking

### **2.13.1 Techniques Which Assess Prior Knowledge, Recall and Understanding**

This technique is designed to collect specific and useful feedback on students' prior learning. "Background Knowledge Probes" are short, simple questionnaires prepared by instructors at the beginning of a course at the start of a new unit or lesson, or prior to introducing an important new topic. Such "probes" may require students to write short answers, to circle the correct responses to multiple-choice questions, or both. They can be used as both pre- and post-assessments: before instruction, to find out the students' "baseline" knowledge level; and immediately after, to get a rough sense of how much and how well they have we learned the material.

### **2.13.2 Techniques Which Assess Skill in Synthesis and Creative Thinking**

The instructor asks students to answer the questions about a given topic: "Who does what to whom, when, where, how and why"? Then the student is asked to transform responses to those questions into a single, grammatical sentence. Faculty gauges the extent to which students can summarize a large amount of information concisely and completely. Students are constrained by the rules of sentence construction and must also think creatively about the content learned. Students practice the ability to condense information into smaller, interrelated bits that are more easily processed and recalled.

### **2.13.3 Techniques Which Assess Skill in Application and Performance**

The instructor asks students to paraphrase part of a lesson for a specific audience and purpose, using their own words. This is especially useful for pre-professional students who will be asked in their careers to translate specialized information into language that clients or customers can understand. This technique allows faculty to examine students' understanding of information and their ability to transform it into a form that can be meaningful to specific



audiences other than the student and instructor. This task is more complex than simple paraphrasing in that the faculty member directs the student to speak/write to a particular audience and purpose.

#### **2.13.4 Analytic Memo of Assessing Skill in Analysis and Critical Thinking**

The analytic memo is basically a simulation exercise. It requires students to write a one- or two-page analysis of a specific problem or issue. The person for whom the memo is being written is usually identified as an employer, a client, or a stakeholder who needs the student's analysis to inform decision making. This technique assesses students' ability to analyze assigned problems by using the discipline specific approaches, methods, and techniques they are learning. In addition, it assesses students' skill at communicating their analyses in a clear and concise manner.

#### **Check your Progress-4**

13. List out the different assessment methods in teaching-learning process.

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14. What is the purpose of assessment techniques?

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15. How assessment helps for a teacher?

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#### **2.14 LET US SUM UP**

So far you have learnt the Evaluation is a series of activities that are designed to measure the effectiveness of the teaching learning as whole process. You have also learnt the most important characteristics of evaluation are validity, reliability, objectivity and usability. Different Methods of finding Validity like Content Validity, Construct validity, Criterion-Related Validity, Concurrent Validity, Predictive Validity and Face Validity were also studied in brief. The factors

affecting the validity of the items were also studied. It is learnt that consistency of the measurement is otherwise known as reliability and also knew Test-Retest Method, Equivalent-Forms Method, Split-Half Method and Kuder-Richardson Method. You have understood that Objectivity means the state or quality of being true even outside of a subject's individual biases, interpretations, feelings, and imaginings. High objectivity tests and Moderate objectivity were also seen.

The time available for testing and cost of testing are to be considered while selecting evaluation tools. The practicability is also seen to be considered worthwhile. Details of norm – referenced test was given. It is a test design to provide a measure of performance that is interpretable in terms of an individual's relative standing in some known group. Its characteristics, merits and demerits were also discussed. The educational objectives are also elaborated in detailed manner. It was stated that educational objectives are not only the goals which shape the students towards instruction, it is also the basis for teaching activities and evaluation techniques. Its functions, structure and assessment methods were seen there.

Assessment techniques were also understood in detail. Assessment is a formative rather than a summative approach to assessment. Its purpose is to improve the quality of student learning, not to provide evidence for evaluating or grading students. Its advantages, particularly to the student and teachers and different techniques were also discussed.

## **2.15 ANSWERS TO ‘CHECK YOUR PROGRESS’**

1. Evaluation is a series of activities that are designed to measure the effectiveness of the teaching learning as whole process.
2. The most important characteristics of evaluation are validity, reliability, objectivity and usability.
3. The different categories of validity are content validity, construct validity, criterion-related validity, concurrent validity, predictive validity and face validity.
4. Reliability refers to the consistency of measurement, that is, how consistent are evaluation results from one measurement to another.
5. The different methods of reliability are Test-Retest Method, Equivalent-Forms Method, Split-Half Method and Kuder-Richardson Method.

6. Objectivity means the state or quality of being true even outside of a subject's individual biases, interpretations, feelings, and imaginings.
7. The things need to be kept in mind while selecting evaluation tools are Ease of Administration, Appropriate Time for Administration, Ease of Interpretation of Results and Cost of Administering Tests.
8. The qualities of practicability in a test involve factors such as cost, administration, scoring method, mode of interpretation, time and availability of tests.
9. Norm-referenced test is a test design to provide a measure of performance that is interpretable in terms of an individual's relative standing in some known group.
10. Different assessment methods in teaching-learning process are selected response and short answer, extended written response, Performance assessment, Personal communication.
11. Its purpose is to improve the quality of student learning, not to provide evidence for evaluating or grading students.
12. Assessment helps faculty to focus on student learning. By determining what students have learned and what is unclear, instructors can focus the class more effectively to meet the learning needs of that group.

## **2.16 UNIT END EXERCISES**

- Describe the meaning of Evaluation
- Explain Validity and its different methods
- Gives Reliability and its different methods
- States the meaning of Objectivity
- Describe the factors of Usability
- Enumerate the qualities of practicability
- Discuss the Norms and its Characteristics
- Explain the educational objectives and its functions
- Bring out the different assessment methods and techniques

## 2.17 SUGGESTED READINGS

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## **UNIT – III**

### **FORMATIVE AND SUMMATIVE ASSESSMENTS**

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#### **STRUCTURE**

- 3.1 INTRODUCTION**
- 3.2 LEARNING OBJECTIVES**
- 3.3 TYPES OF ASSESSMENT**
- 3.4 FORMATIVE ASSESSMENT**
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- 3.11 DIFFERENCE BETWEEN FORMATIVE AND SUMMATIVE ASSESSMENT**
- 3.12 TESTS**
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- 3.13 ALIGNS FORMATIVE AND SUMMATIVE ASSESSMENTS**
- 3.14. LET US SUM UP**
- 3.15 ANSWERS TO ‘CHECK YOUR PROGRESS’**
- 3.16 UNIT END EXERCISES**
- 3.17 SUGGESTED READINGS**

### **3.1 INTRODUCTION**

In the present unit, you will be learning about Formative and Summative Assessments. Assessment is an integrated part of the teaching process and a new technical term indicated to design more comprehensive concept of measurement. To test the efficiency of teaching, one requires a sort of measuring tools. It is the process of gathering and interpreting evidence on changes in the behavior of all students. Assessment is the collection; analysis and interpretation of information about any aspect of an education to what extent the desirable objective have been achieved. Assessment is concerned with assessing the effectiveness of teaching, methods, techniques and teaching strategies. Both the teacher and taught get feedback about their performance. Curriculum tests can be done. In the employment market, demands and supplies can all so be assessed. Parents also get benefitted by the Assessment. Assessment is vital to the education process. In schools, the most visible assessments are summative.

### **3.2 LEARNING OBJECTIVES**

After learning this unit, you will be able to

- explain the meaning, Purpose and essential features of Formative Assessment (FA)
- what are the major barriers to wider use of FA?
- bring out the role of students and teachers in FA
- describe observation, questioning, and reflection on learning as strategies for using Assessment in the process of learning.
- understand the use of Projects, Assignments, Work Sheets and Practical Work.
- bring out the Performance Based Activities and Reports as assessment devices; Self, Peer and Teacher Assessments.
- explain the meaning and Purpose of Summative Assessment
- discuss the use of Teacher-Made and Standardised Test
- elaborate the aligning of Formative and Summative Assessments

### **3.3 TYPES OF ASSESSMENT**

There are two types of Assessments

- Formative Assessment
- Summative Assessment

### **3.4 FORMATIVE ASSESSMENT**

Formative assessment means programme which are directed to modify or to improve. Formative assessment is an active learning process that the teachers and the students continuously and systematically improving students achievement. Teachers and their students actively engage in the formative assessment process to focus on learning goals and take action to move closer to the goal.

It should be conducted continuously throughout the course. It is used to improve instruction and learning and to keep both students and teachers aware of the course objectives and the student's progress in achieving those objectives. The results of formative Assessment are analyzed and used to focus the efforts of the teacher and students. Under the formative Assessment encompasses teacher observation class room discussion and analysis of student work, including homework and tests. The Assessment become formative when the information is used to adapt teaching and learning to meet student needs. Formative Assessment can be carried out through unit tests, home assignments and quiz programmes, etc.

The primary purpose of formative assessment is to improve learning, not merely to audit it. It is assessment for learning rather than assessment of learning. Formative assessment is both an instructional tool that teachers and their students use while learning is occurring. Teachers and students adopt the role of intentional learners. The formative assessment process constantly uses evidence to guide teaching and learning.

#### **3.4.1 Implications**

This is done during the instructional process.

- Assessment should aim at objectives of instructional process.
- It must modify the process if needed before the completion.

#### **3.4.2 Characteristics**

- This aims at continuous feedback for both teachers and students.
- Feedback provides specific learning errors
- Assessment also provides reinforcement to students
- It seeks to identify the variables
- This leads to get information to teachers whether any modification is necessary

- Assessment tends to ignore the effects of programmes

Formative assessment is to monitor the learning process of students during teaching. Feedback is the reinforcement of successful learning and instruction to modify the pattern. Thus the formative assessment is concerned with the judgment of the programme. Teachers and students use the evidence they gather to make adjustments for continuous improvement.

### **3.4.3 Barriers to Conducting Formative Assessment**

Almost one quarter of the teachers say they do not face any barriers to conducting formative assessment. Among those who did indicate barriers, the most frequently selected barriers were related to time. A teacher reporting of barriers to formative assessment is consistent across subject areas and grade levels. Years of experience teaching was related to teachers reporting insufficient training for formative assessment and facing no barriers.

With the shift from print to digital, students receive hundreds of pieces of feedback from the thousands of keystrokes that make up their digital day. The problem is that, other than proprietary walled gardens, none of that feedback is collected consistently and presented in a unified manner. This spring they cataloged formative assessment products with a focus on those that were more authentic and open ended. It was disappointing to find that most teachers still use spreadsheets to manually enter and track formative assessment data. They spotted four problems

- Different standards
- No common tagging scheme for content and assessment
- No agreement on competency
- Inadequate tools

Digital learning and the explosion of formative data means the beginning of the end of weeklong state tests. By using thousands of formative observations it will be increasingly easy to accurately track individual student learning progressions. But making better use of the explosion of formative data will require leadership and investment.

This is an education problem more than a technology problem. It would help if school networks agreed on competency-based protocols and used their market leverage to drive investment to solutions.



Thus the followings are lack in Formative Assessment

- ❖ Lack of experienced, honest and sincere teachers.
- ❖ Take more time to undertake several activities.
- ❖ Sometimes misused by the teachers.
- ❖ Lack of facilities and co-ordination in schools.
- ❖ There may be weaker students for remedial work.

#### **Check your Progress-1**

16. Explain the Assessment.

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17. What are the different types of assessments?

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18. State the barriers to conducting Formative Assessment.

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#### **3.4.4 Assessment for Learning**

Much classroom practice can be described as assessment activities. Teachers set tasks and activities and pose questions to learners. Learners respond to the tasks, activities and questions and the teachers make judgments on the learner's knowledge, understanding and skills acquisition as evidenced in the learner's responses. These judgments on learner's performance happen quite naturally in the course of any teaching and learning session and require two-way dialogue, decision-making and communication of the assessment decision in the form of quality feedback to the learner on their performance. Depending on how successfully these classroom practices have been undertaken, learning will have taken place in varying degrees from learner to learner. At the end of each session, teachers need to ask themselves how effective a particular session.

### **3.4.5 Plans for Learning**

Learning does not happen incidentally, it has to be carefully planned. Planning is an essential part of a teacher's workload. Teachers need to plan and create opportunities within each session for both the learner and the teacher to obtain information about a learner's progress towards the learning goals defined by the teacher at the start of the session. It is crucial that the learning goals are communicated to the learner and of equal importance is that the teacher checks to ensure that the learner not only understands the learning goals, but also appreciates the assessment criteria which will be used to assess the work.

Teachers need to

- decide what is going to be learnt in a particular session
- define the learning goals
- communicate the learning goals to the learners
- compile questions and design tasks to check learner understanding of the learning goals
- explain to the learners the criteria which will be used to assess their work
- decide how feedback is going to be provided
- define how learners will take an active part in the assessment process
- plan opportunities for learners to use the feedback provided on the assessment decision to further progress

### **3.4.6 Formative Assessment Process affects Student learning and Achievement**

There is a firm body of evidence that formative assessment is an essential component of classroom work and that its development can raise standards of achievement. In many classrooms, teachers and their students are flying blind. Teachers cannot point to strong evidence of exactly what their students know and exactly where their students are in relation to daily classroom learning goals. The lack of detailed and current evidence makes it particularly difficult for teachers to provide effective feedback that describes for students the next steps they should take to improve. Without the benefit of knowing how to assess and regulate their own learning, they try to perform well on assignments without knowing exactly where they are headed, what they need to do to get there and how they will tell when they have arrived.

### **3.4.7 Formative Assessment Forge a Teacher-Student Learning Partnership**

High quality formative assessment blurs the artificial barriers between teaching, learning and assessment to forge a culture of collaborative inquiry and improvement in the classroom. As this learning partnership grows stronger, conversations about learning become the rule of thumb rather than the exception to the rule. Teachers and students work together to gather information about the strengths and weaknesses of their performances in ways that inform all learners and all learning in the classroom. The formative assessment fundamentally changes the quality and quantity of teacher-student interactions and every day, throughout the day, what happens in the classroom focuses squarely on student achievement.

### **3.4.8 Misconception**

Misconceptions are the inevitable result of misunderstanding and often cause teachers to question the formative assessment process. Clearly these misconceptions can dilute the effectiveness of formative assessment and block its consistent use in the classroom.

Formative assessment is not a test item, a test, or a series of tests.

- Formative assessment is an intentional learning process teachers engage in with their students to gather information during the learning process to improve achievement.
- Formative assessment is a learning partnership that involves teachers and their students taking stock of where they are in relation to their learning goals.
- Formative assessment is not a prepackaged program or set of techniques that teachers adopt and enact.
- Formative assessment is a philosophy of teaching and learning in which the purpose of assessing is to inform learning, not merely to audit it.
- The formative assessment process is a fundamental reframing of the work teachers and students do day to day and minute by minute in the classroom.
- Although the quality of teaching rises as a result of formative assessment, the intended outcome must be to raise the learning and achievement of the students currently in the classroom on the concepts, processes and skills.

### **3.4.9 Formative Assessment and Motivation**

The term motivation comes from the root word motive, which means "something that causes a person to act." Using that root, we can define motivation as something that energizes, directs, and sustains behavior toward a goal. Another way to say this is that motivation is goal-directed behavior combined with the energy and the intention to work toward that goal. In a very real way, motivation gets students learning, points them in the right direction, and keeps them engaged. Many educators view motivation as something that comes from external factors such as rewards, incentives, punishments, and warnings carrots and sticks. This view is not exactly flawed, because one form of motivation, extrinsic motivation, fits nicely into this description. The crux of the matter, though, is that extrinsic motivation applied to the classroom requires that the teacher use rewards and punishments to control the motivation of students. It follows that students will only be motivated as long as they are under the control of the teacher. Without the teacher, the motivation disappears.

In contrast, the formative assessment process has no downside. In fact, it is strongly linked to increased student achievement. Formative assessment helps students harness the workings of their own minds to continuously generate and strengthen the four important components to learn.

#### **3.4.10 Four Important Components**

The four important components to strengthen the learning are

##### **a. Self-efficacy**

A learner's belief in ability to succeed in a particular situation.

##### **b. Self-regulation**

The degree to which a learner is Metacognitive, motivationally and actively participating in own learning.

##### **c. Self-assessment**

A learner's act of observing, analyzing and judging own performance on the basis of criteria and determining to improve it.

#### **d. Self-attribution**

A learner's own perceptions or explanations for success or failure that determine the amount of effort will expend on that activity in the future.

#### **Check your Progress-2**

19. Bring out the role of students and teachers in formative assessments.

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20. What will be the impact of Misconception in Formative Assessment?

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21. Write the important components to strengthen the students learning.

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### **3.5. PROJECT**

Project is the modern method in which the students creativity in designing the content of studies. According to W.H. Kilpatrick, “A project is a wholehearted purposeful activity proceeding in a social environment.

#### **3.5.1 Types of Project**

**a. Individual and Social Projects:** In individual project every students problem is solved in their own according to interest, capacity and attitude.

**b. Group Projects:** The problem is solved by the group of pupil in the class. Here the social, citizenship qualities developed.

**c. Simple and Complex Projects:** In the simple projects the students are completing only one work at a time. It gives the deep information of the project, thus the students get deeper and broader knowledge about the problem. In the complex project the students are carried out more than one work at a time. They are focuses on the work in various activities and dimensions.

According to Kilpatrick there are four types of projects. They are

- **Constructive Project:** Practical or physical tasks such as construction of articles, making the models and playing the drama all done in this.
- **Aesthetic Project:** Appreciation powers of the students are developed in this type of project through the musical programmes of beautician and appreciation of poems.
- **Problematic Project:** In this type of project develops the problem solving capacity of the students through their experiences. It is based on cognitive domain.
- **Drill Project:** It is for mastery of skill and knowledge of the students, also increases the capacity and efficacy of the students.

### **3.5.2 Steps of a Project Method**

#### **a. Creating Situation**

In the first step teacher creates the proper situation to the students in the class. He puts the knowledge of project it should not force but arise of need with them.

#### **b. Selection of the problem**

The teacher helps the students to select the problem and guide them. Students are having freedom to select the problem.

#### **c. Planning**

The teacher discuss with the students about the problem in various angles and points. After the free express of student's opinion about the problem, the teacher writes stepwise in the board.

#### **d. Execution**

The students are stating their work in this step. They are collecting the relevant information and materials at first. The teachers give time and right to the students according to their speed to complete the work with their ability and interest.

### **e. Evaluation**

Evaluation of the project should be done both by the pupils and the teachers. Here the students evaluating their task. Has done in light of plans and achieved results.

### **f. Reporting and Recording**

It is the last step of the project method in which each and every step of the work is reported. The reported forms are recorded in book.

#### **3.5.3 Role of the Teacher**

- In project method of teaching the role of a teacher is that of a guide, friend and philosopher not a dictator or commander.
- He encourages the students to work cooperatively and alert to avoid the mistakes.
- If the students face failure during execution of some steps of the project, the teacher should not execute any portion of the project instead he encourages better methods or approaches to get success.
- He should have a thorough knowledge of individual children so as to allot them work accordingly. He should have initiative, tact and zest for learning.
- Teacher should active and alert then he also maintain the democratic atmosphere.

#### **3.5.4 Merits of Project Method**

- Students get proper freedom to execute the project in accordance with their interest and abilities because they satisfied the needs.
- Habit of critical thinking gets developed among the students through this method.
- With this method, students get ample chances which they can develop coordination among their body and mind.
- This method helps in promoting social interaction and co-operation among the students, as they have to work in group and interact with experts.
- Mostly the projects are undertaken in classroom as classroom assignments, because of which load of homework from the students for reduced to considerable extent.

### **3.5.5 Demerits of Project Method**

- This method takes a lot of time to plan and execute a single project.
- It is not possible to design different projects for different topics and also not able to cover all topics in the content.
- Such method can only be proving successful if the teacher is highly knowledgeable, alert and exceptionally gifted.
- Teachers do not possess lot of information regarding the manner in which this method should be used as result and hesitate to use.

Project learning, is a dynamic approach to teaching in which students explore real world problems and challenges, simultaneously developing cross curriculum skills while working in small collaborative groups. Because students are evaluated on the basis of their projects, rather than on the comparatively narrow rubrics defined by exams, essays, and written reports, assessment of project work is often more meaningful to them. They quickly see how academic work can connect to real-life issues and may even be inspired to pursue a career or engage in activism that relates to the project they developed.

### **3.6 ASSIGNMENTS**

Assignments are used as learning device and tool for evaluation. There is no doubt that assignment is carefully planned and regularly valued by the teachers to improve the student's attainment. The assignment is one of the most important phases of teaching.

#### **3.6.1 Purpose of Assignments**

- ❖ To provide opportunities to students to work and practice independently.
- ❖ To develop self-reliance and initiative.
- ❖ To develop habits of reading regularly among the students.
- ❖ To provide opportunities to students to utilize the leisure time profitably.
- ❖ To provide remedial measures for backward students.



### **3.6.2 Kinds of Assignment**

- **Page-by-Page Assignment**

This type is sometimes called the textbook assignment. It designates the number of pages to be covered. Page-by-page assignment is unsatisfactory, but recent studies have revealed that this type is still widely used in the elementary grades.

- **Chapter Assignment**

This is another form of traditional or textbook assignment. Like the first type, it is still extensively used in secondary schools and in colleges. Preparation for this type of assignment is left entirely to the pupils.

- **Problem Assignment**

This type of assignment gets away from the basic textbook idea. It encourages the use of references and stimulates reflective thinking. In this type the problem to be solved is the prime consideration. Special directions and suggestions are important in this type of assignment.

- **Topical Assignment:**

In this kind of assignment the topic to be developed is the prime consideration. This is also a form of textbook assignment which is often given in social and natural science subjects.

- **Project Assignment**

This is a special type of assignment which is best adapted to vocational courses, to natural science subjects, and in some measure to social science subjects and others content subjects. In this type of assignment a project is considered a unit.

- **Contract Assignment**

This form of assignment is extensively used in individualized types of instruction with the main purpose of adjusting the task to the ability and interest of the individual.

- **Unit Assignment**

This type is associated with the Mastery Plan and the Cycle Plan of instruction. It is best adapted to the subjects which are divided into units. The so called flexible assignment is used with the unit assignment plan.

- **Cooperative or Group Assignment**

Cooperative assignment is most frequently utilized in a socialized type of recitation, or in a project method of instruction. Assignment of this type stimulates pupils to do their own thinking and to organize their materials. Here pupils also participate in determining desirable objectives and in deciding what should be done to attain them. Cooperative assignment can be utilized to advantage in many high school classes.

- **Syllabus Assignment**

Syllabus assignment is often utilized in the college or university. In this type of assignment, questions and references are given to guide the students. Here again guide questions and other suggestions are given to insure attention to the important points of the lesson.

- **Drill Assignment**

It is the purpose of this assignment to strengthen the connections formed in the process of growth in mental motor skills. Memorizing a poem or mastery of facts or simple combination facts in Arithmetic are good examples of this type of assignment. Drill assignment, like other type of assignment, should be motivated.

Writing Assignments, particularly for portfolio units, often reflect the length and depth of the units themselves. The assignments may last between six and eight weeks and the initial briefing seems a long time ago. Learners think they have forever to complete an assignment, especially extensive assignments which are designed to generate evidence, possibly in its entirety for a portfolio unit. If learners' progress is not checked at key stages throughout the assignment, individuals may and often do lack focus in pursuing the learning objectives and become confused about the outcomes. Deadline dates for these assignments are often the ones that are not adhered to.

Teachers need to

- compile assignments that are broken down into a series of tasks, building in reviews and feedback opportunities.
- prescribe a completion date for each task and provide support to ensure that learners set individual targets to meet the required outcomes of the task.
- provide informal oral feedback when required as part of classroom monitoring activities.
- review the progress against targets and provide feedback.
- provide opportunities for learners to reflect on feedback provided and act on advice given.
- provide opportunity for consolidation work to be undertaken by less able learners. make sure that any remedial work is again reviewed and feedback provided before learners progress to the subsequent task.
- create opportunities for learners to participate in peer assessment and self-assessment activities on completion of the overall assignment.
- undertake formal assessment of learners work and return assessed work with written feedback within the agreed period.

### **3.7 PRACTICAL WORK**

Practical work is considered an integral part of students experience in the discipline. Practical work is a necessary part of the learning experience of most students and especially those of science, engineering and health related disciplines. It serves many purposes it can develop essential transferable skills, perhaps associated with information technology, it can develop subject specific skills and it can serve to demonstrate and reinforce material of lecture courses. Practical work helps them to learn team-working skills, safe working practices and self-dependence.

Practical work refers to those activities in which students manipulate and observe real objects and materials in the laboratory and the field. Practical work in the subjects sits within thinking and working scientifically and is intrinsic to a full learning experience for students; it is not an additional component of teaching and learning.

There should be an expectation that on completing the course students are able to perform a range of procedures with due regard for accuracy and risk management. They should have hands on experience of conducting specific technical and manipulative tasks. Students should be given the opportunity to undertake work in which they make their own decisions, for example through an investigation of their choosing over an extended period of time. They should be assessed on their ability to plan, observe, record, analyze, communicate and evaluate through this activity. A range of practical activities should be incorporated into the teaching of ideas to enable students to develop their understanding through interacting with objects and observations. It is widely recognized that practical work is a vital element of school and there are a number of high quality resources to support it. However, practical work always impact sufficiently on pupil's engagement and learning.

Practical work aims to improve

- clarity of learning outcomes associated with practical work
- effectiveness and impact of practical work on learning
- quality rather than quantity of practical work and
- to ensure that these developments are sustainable

### **3.8 WORKSHEET**

Worksheet commonly refers to a sheet of paper with questions for students and places to record answers. The term may also refer to a single array of data in spreadsheet software or an informal piece of paper that an accountant uses to record information.

In the classroom setting worksheets usually refer to a loose sheet of paper with questions or exercises for students to complete and record answers. They are used, to some degree, in most subjects, and have widespread use in the curriculum. These are intended to help a student become proficient in a particular skill that was taught to them in class. They are commonly given to students as homework. They made up of a progressive set of questions that leads to an understanding of the topic to be learned.

### **3.9 PERFORMANCE-BASED LEARNING**

In the act of learning, people obtain content knowledge, acquire skills and develop work habits and practice the application of all three to real world situations. Performance-based learning and assessment represent a set of strategies for the acquisition and application of knowledge, skills and work habits through the performance of tasks that are meaningful and engaging to students.

Performance-based learning and assessment achieve a balanced approach by extending traditional fact-and-skill instruction. Performance-based learning and assessment are not a curriculum design. Whereas we decide what to teach, performance-based learning and assessment constitute a better way to deliver the curriculum. Teachers do not have to “give up” units of study or favorite activities in a performance-based classroom. Because authentic tasks are rooted in curriculum, teachers can develop tasks based on what already works for them. Through this process, assignments become more authentic and more meaningful to students.

#### **a. Performance Tasks**

Performance tasks build on earlier content knowledge, process skills and work habits and are strategically placed in the lesson or unit to enhance learning as the student pulls it all together. They are both an integral part of the learning and an opportunity to assess the quality of student performance. When the goal of teaching and learning is knowing and using, the performance-based classroom emerges.

Performance tasks range from short activities taking only a few minutes to projects culminating in polished products for audiences in and outside of the classroom. In the beginning, most performance tasks should fall on the short end of the continuum. Teachers find that many activities they are already doing can be shaped into performance-learning tasks.

Two initial concerns of teachers moving toward performance-based classrooms include the amount of time needed for performance tasks and the subjectivity traditionally associated with teacher assessment and assigning grades. The initial move to any new method involves an investment in time. The development of performance-assessment tasks is no exception. With a little practice, however, teachers find that they can easily and quickly develop performance tasks and assessment lists. This process is further simplified as teachers and schools begin to collect

and maintain lists of generic tasks and assessments that teachers can adapt for individual lessons. Teachers find assessment lists a more efficient way of providing feedback to students than traditional methods, thus saving time in the long run. Finally, as students work with performance.

Assessment, the quality of their work improves; reducing the time teachers must spend assessing and grading student work.

### **b. Performance Task Assessment**

Performance task assessment lists are assessment tools that provide the structure students need to work more independently and to encourage them to pay attention to the quality of their work. Assessment also enables the teacher to efficiently provide students with information on the strengths and weaknesses of their work. In creating performance task teachers focus on what students need to know and be able to do. One result is that teachers can more consistently and fairly evaluate and grade students work. Information from performance task assessment also helps students set learning goals and thus helps teachers focus subsequent instruction.

Before they submit their work, students do a final inspection of their own graphs and complete the self-assessment column. During this self-assessment step, students often find ways to improve their work. Peer assessment can also take place at this time. Experiences with peer assessment often improve students' self-assessing skills. The final step is for the teacher to assess the work and at the same time, evaluate the student's self-assessment. When discrepancies are found between the student's self-assessment and the teacher's assessment of the student's work, the teacher may decide to hold conferences with the students who need work on improving the accuracy of their self-assessment.

### **c. Peer Assessment**

It is widely recognized that when learners are fully engaged in the learning process, learning increases. A fundamental requirement of Assessment for Learning is for learners to know what they have to learn, why it is required and how it is to be assessed. When learners are able to understand the assessment criteria, progress is often maximized, especially when individuals have opportunities to apply the assessment criteria to work produced by their peers as part of planned classroom activities. Peer assessment using the predefined assessment criteria is the next stage to evaluate learner understanding and consolidating learning.

#### **d. Benefits of organizing peer assessment activities**

- learners clarifying their own ideas and understanding of the learning intention
- Checking individuals' understanding of the assessment criteria and how it is to be applied to learners' work.

#### **e. Self-Assessment**

Once learners are able to use the assessment criteria appropriately and can actively contribute to peer-assessment activities, the next step is to engage them in self-assessment tasks. Self-assessment is a very powerful teaching tool and crucial to the Assessment for Learning process. Once learners can engage in peer-assessment activities, they will be more able to apply these new skills to undertaking 'objective' assessment of their own work. We all know it is easy to find fault in other people's work, but it is a far more challenging process to judge one's own work. Once learners can assess their own work and their current knowledge base, they will be able to identify the gap in their own learning; this will aid learning and promote progress and contribute to the self-management of learning.

Teachers need

- provide opportunities for learners to reflect on their own work
- ensure they provide individuals with the necessary support so that they are able to acknowledge shortcomings in their own work
- support learners through the self-assessment process so that strengths in their work are fully recognized and weaknesses are not exaggerated to the point that they damage learners' self-esteem.

#### **f. Strategy for Assessment for Learning**

- Video clips of good practice provided in the file were used in the first training session
- The school believes that Hind sight it would have been better to use examples of good achievability at their also its suitability for their learners.
- All staff is undertaking all units of the training pack.

- At the end of the training for a unit, staff audit where they are up to, undertake individual target-setting and then they are required to plan how they are going to meet these targets.

Self and peer assessment helps to create a learning community within a classroom. Students who can reflect while engaged in metacognitive thinking are involved in their learning. When students have been involved in criteria and goal setting, self-evaluation is a logical step in the learning process. With peer evaluation, students see each other as resources for understanding and checking for quality work against previously established criteria.

### **Check your Progress-3**

22. Define Project.

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23. What is meant by Topical Assignment?

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24. Give the purposes of Practical Work.

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### **3.10 SUMMATIVE ASSESSMENT**

Summative Assessment (SA) is given to the students after he or she has passed all the formative assessments. The effectiveness of teaching and instruction is evaluated on the basis of student's performance. SA comes at the end of course. SA is done at the end of instruction to measure at what extend the students have attained their achievement.

SA is concerned with the learning outcomes in the teaching-learning process. The results are statistically analyzed and interpreted. SA involves the final tests or the annual examinations



that declare a student's promotion to the next higher class or detention in the same class. A summative evaluator gathers information and judges the merit of overall instructional sequence to retain or adapt that sequence. Teachers adopt the role students assume the roles to make final decisions about instructional activities. The formative and summative assessments are complimentary to each other in teaching-learning.

### **3.10.1 Characteristics of Summative Assessment**

- ❖ It is descriptive analysis.
- ❖ This focus mainly on analysis.
- ❖ It tends to stress the effects.
- ❖ It also provides the appropriateness of course and effect of instruction.

### **3.11 DIFFERENCE BETWEEN FORMATIVE AND SUMMATIVE ASSESSMENT**

The instructional programme in formative assessment is still following but in summative assessment is not following in most of cases.

- The formative assessment is to develop not for judgments in nature as the summative assessment judges the merit of instructional sequences.
- Formative assessment is the assessment made during the instructional phase about progress in learning but the summative assessment is the terminal assessment of performance at the end of instruction.
- Formative assessment the scores of individual pattern of pass-fail whereas in summative assessment report is given in terms of total scores.
- Formative assessment content focus is detailed and it is narrow and in summative assessment content is general and broad.
- In formative assessment process is given in daily assignments in observation method but in summative assessment process in projects and test.

### **3.12 TESTS**

#### **3.12.1 Types of Tests**

The test is to measure the ability, knowledge or performance developed during the course of learning. Here two types of test are given to assess the knowledge of students they are Teacher Made Tests and Standardized Tests.

### **a. Teacher Made Tests**

These tests are designed by the teachers for the purpose of conducting classroom tests. These teacher made tests can be in the form of oral tests and written tests. These tests have a limited area of application and are prepared almost by all teachers according to their requirements.

A teacher is more concerned with the teacher – made tests as she is directly involved in its construction. Moreover, the teacher made tests have an advantage over standardized tests because they can be constructed to measure outcomes directly related to classroom specific objectives and particular class situations. These tests are within the means of every teacher and most economical. Teacher made oral tests are designed to measure the performance of students skills like listening and speaking in language learning. Written tests are designed to test the abilities of student's knowledge comprehension and written expression.

### **b. Standardized Tests**

A Standardized test is one which norms have been established. The test has been given to a large number of students. A norm is an average score which measures achievement. So, every standardized test has norms. It is intended for general use and covers a wider scope of material than is covered in an ordinary teacher made test. A standardized test is one in which the procedure, apparatus and scoring have fixed so that precisely the same test can be given at different time and places. A standardized test is one which has been given to so many people that the test makers have been able to determine fairly accurately how well a typical person of a particular age or grade in school will succeed in it.

#### **i. Role of Standardized Test**

- ❖ Information becomes easier to convince the guardians of students
- ❖ Information in much less time than provided by other devices.
- ❖ Information for all guidance workers.
- ❖ Aspects of the behaviour which otherwise could not be obtained.
- ❖ Objectives and impartial informative about an individual.

## **ii. Steps Involved in Standardized Test**

A standardized test is tried out and administered on a number of subjects for the expressed purpose of refining the items by subjecting the performances of the standard decision to pertinent statistical analysis. The steps for the standardized test is constructed by test specialists or experts they are

- ❖ Proper planning
- ❖ Adequate preparations
- ❖ Try-out of the test
- ❖ Preparation of proper, norms
- ❖ Preparation of a manual containing instruction of administering a tool or test.
- ❖ Item analysis

## **iii. Teacher made Test vs. Standardized Tests**

The standardized test is based on the general content and objectives common to many schools all over the country whereas the teacher made test can be adapted to content and objectives specific to his own situation. The standardized test deals with large segments of knowledge or skill whereas the teacher made test can be prepared in relation to any specific limited topic. The standardized test is developed with the help of professional writers, reviewers and editors of tests items whereas the teacher made test usually relies upon the skill of one or two teachers. The standardized test provides norms for various groups that are broadly representative of performance throughout the country whereas the teacher made test lack this external point of reference.

## **iv. Characteristics of a Standardized Test**

- Standardized tests are based on the content and objectives of teaching common to many schools.
- Not just one, but a team of experts are involved in the writing of test items.
- Items analysis is done on the basis of a pilot study, unlike in the case of a class room test.
- Norms are calculated for the purpose of comparison between grades, schools, age levels and sexes.
- They cover large segments of knowledge and skills.

- Test manuals are prepared.
- Fairly a large same, not just one class is involved in the standardization of a test.

Teacher need to test student performance. Test results are critical, not only because the affect careers, but because of the influence they exercise on motivation to learn. Teacher must be aware of different testing techniques, because they give useful information to both the teacher and the students. Testing techniques are often similar the teaching techniques, but with a different purpose.

### **3.12.2 Importance of Testing**

1. Tests tell the teacher what the students can and cannot do and here are how successful the teaching has been.
2. They also tell the teacher what areas need to be taught in the future.
3. Test tell the students how well they are progressing, and where they need to focus their attention as learners.
4. Regular tests also encourage students to take their learning seriously, and give them a series of definite goals to aim towards.

### **3.12.3 Similarities**

- They are both means of performance assessment.
- They both use the same type of test items.
- They both require validity, reliability, objectivity and efficiency.

### **3.12.4 Differences**

- The classroom test may have more content validity than standardized tests.
- The quality of the test items on the standardized test is usually superior because they are prepared by test specialists and are revised on the basis of actual try out and item analysis.
- The procedures used in administering and scoring standardized tests are carefully described and they are standardized for each administration of the test.

- The student's score on a standardized test is interpreted on basis of norms already developed on a large sample. But the student's score on a classroom test is interpreted in relation to the average score of the classroom students.
- Standardized tests are always accompanied with tests manuals which report data on test validity and reliability and provide directions for test administration. Such information is usually not available for classroom tests.

### **3.13 ALIGNS FORMATIVE AND SUMMATIVE ASSESSMENTS**

Assessment innovations require explicitly challenging teachers' assessment conceptions. In changing towards outcome based curricula, aligning formative to new summative assessments is a challenge. It aims to provide concrete insights into what teacher conceptions hinder the development of aligned formative assessment practices. In a structured collaborative action research, practitioners, researchers and consultants analyze teachers' formative practices; identify underlying current conceptions and their misalignment to the new summative assessment system. An iterative process resulted in an overview of current conceptions versus required conceptions; showing required conceptual changes that are prerequisite for teachers to change towards formative assessment practices that are aligned to the new outcome based summative assessment system.

#### **Check your Progress-4**

25. Give any two differences between Formative and Summative Assessments.

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26. Define Standardized Tests.

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27. Write the similarities between Teacher made Test and Standardized Tests.

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### **3.14. LET US SUM UP**

So far you have learnt the Assessment is an integrated part of the teaching process and a new technical term indicated to design more comprehensive concept of measurement. You have also learnt the Meaning, Purpose and essential features of Formative Assessment (FA). Formative assessment means programme which are directed to modify or to improve. Its Implications, characteristics and Barriers to Conducting Formative Assessment were also studied in short. Major barriers to wider use of FA, role of students and teachers in formative assessments were also studied. You have implicit the Uses of Projects, Assignments, Work sheets, Practical work, Performance-based activities and Reports as assessment devices; Self, Peer and Teacher assessments. Summative Assessment (SA) comes at the end of course. SA is done at the end of instruction to measure at what extend the students have attained their achievement. You have also learnt the Characteristics of SA and Difference between Formative and Summative Assessment. You have also studied the characteristics of Teacher-Made Test and Standardised Test to measure the students' achievement.

### **3.15 ANSWERS TO ‘CHECK YOUR PROGRESS’**

1. Assessment is the collection; analysis and interpretation of information about any aspect of an education to what extent the desirable objective have been achieved.
2. There are two types of Assessments namely Formative Assessment and Summative Assessment.
3. The factors to conducting Formative Assessment are Different standards, No common tagging scheme for content and assessment, No agreement on competency and Inadequate tools.
4. Teachers set tasks and activities and pose questions to learners. Learners respond to the tasks, activities and questions and the teachers make judgments on the learner's knowledge, understanding and skills acquisition as evidenced in the learner's responses.
5. Misconceptions can dilute the effectiveness of formative assessment and block its consistent use in the classroom.
6. The four important components to strengthen the learning are Self-efficacy, Self-regulation, Self-assessment and Self-attribution.
7. According to W.H. Kilpatrick, “A project is a wholehearted purposeful activity proceeding in a social environment.

8. In this kind of assignment the topic to be developed is the prime consideration. This is also a form of textbook assignment which is often given in social and natural science subjects.
9. Practical work serves many purposes. It can develop essential transferable skills, subject specific skills and it can serve to demonstrate and reinforce material of lecture courses. Practical work helps them to learn team-working skills, safe working practices and self-dependence.
10. (i). Formative assessment is the assessment made during the instructional phase about progress in learning but the summative assessment is the terminal assessment of performance at the end of instruction. (ii). Formative assessment content focus is detailed and it is narrow and in summative assessment content is general and broad.
11. A standardized test is one in which the procedure, apparatus and scoring have fixed so that precisely the same test can be given at different time and places.
12. i. They are both means of performance assessment. ii. They both use the same type of test items and iii. They both require validity, reliability, objectivity and efficiency.

### **3.16 UNIT END EXERCISES**

- Define the meaning of Assessment
- Explain purpose and principles of Assessment
- What are the types of Assessment?
- List out the barriers for conducting Formative Assessment
- Explain assessment and plan for learning
- Bring out the uses of Projects
- Describe Assignments, Work sheets and Practical work
- Enumerate the nature of Performance-based activities
- Give the nature of Peer and Self-Assessment.
- Explain meaning and purpose of Summative assessment
- What are the uses of teacher - made and standardized tests?
- Describe Aligning formative and summative assessments

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## **UNIT – IV**

### **TOOLS OF ASSESSMENT**

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#### **STRUCTURE**

#### **4.1 INTRODUCTION**

#### **4.2 LEARNING OBJECTIVES**

#### **4.3 COGNITIVE ASSESSMENT AND STUDENT LEARNING**

##### **4.3.1 Convergent and Divergent Thinking**

##### **4.3.2 Divergent Thinking Abilities**

##### **4.3.3 Critical Thinking**

##### **4.3.4 Problem Solving**

##### **4.3.5 Decision Making**

#### **4.4 SELECTED-RESPONSE ASSESSMENT**

##### **4.4.1 Objective Type**

##### **4.4.2 Matching Items**

##### **4.4.3 Short Answer Type**

##### **4.4.4 Essay Type**

#### **4.5 AFFECTIVE LEARNING**

##### **4.5.1 Attitude**

##### **4.5.2 Values**

##### **4.5.3 Interest**

##### **4.5.4 Self-concept**

#### **4.6 OBSERVATION**

##### **4.6.1 Types of Observation**

##### **4.6.2 Steps of Observation**

#### **4.7 CHECKLIST**

##### **4.7.1 Characteristics of Checklist**

##### **4.7.2 Construction and Application of Checklist**

##### **4.7.3 Uses of Checklist**

##### **4.7.4 Limitations of Checklist**

##### **4.7.5 Suggestions for the Effective Use of Checklist**

#### **4.8 RATING SCALE**

##### **4.8.1 Types of Rating Scales**

##### **4.8.2 Importance of Rating Scale**

##### **4.8.3 Limitations of Rating Scale**

#### **4.9 INTERVIEW**

##### **4.9.1 Characteristics of Interview**

##### **4.9.2 Nature of Interview**

##### **4.9.3 Types of Interview**

##### **4.9.4 Steps of Interview**

#### **4.10 PERFORMANCE BASED ASSESSMENT**

#### **4.11 RUBRICS AND ITS IMPORTANCE**

#### **4.12 LET US SUM UP**

#### **4.13 ANSWERS TO ‘CHECK YOUR PROGRESS’**

#### **4.14 UNIT END EXERCISES**

#### **4.15 SUGGESTED READINGS**

## **4.1 INTRODUCTION**

Cognitive learning is the mental process of acquiring knowledge and understanding through thought, experience and the senses. It has so many thinking skills such as Convergent, Divergent, Critical, Problem Solving and Decision Making. Convergent thinking is characterized by rigidity, conformity and unquestioning acceptance of authority whereas divergent thinking stimulates a questioning frame of mind and discourages blind acceptance. Critical thinking is a general term that covers all thinking processes that strive to get below the surface of something: questioning, probing, analyzing, testing and exploring. At the same time, Problem-solving is a mental process that involves discovering, analyzing and solving problems.

Decision making is the process of making choices by setting goals, gathering information, and assessing alternative occupations. There are few selected Response Assessments such as Multiple Choice and Matching and Constructed Response Assessment such as Short-Answer and essay Items. Affective domain describes the way people react emotionally and their ability to feel other living things' pain or joy. Affective objectives typically target the awareness and growth in attitudes, emotion and feelings. Assessment of affective learning is possible through Attitude, Values, Interest and self-concept. There are certain tools and procedures which are used for their assessments are Observation, Interview, Rating Scale, Check List and Inventories. Certain tools/techniques can be prepared for the project-based assessment to grade a performance-based assessment.

## **4.2 LEARNING OBJECTIVES**

After learning this unit, you will be able to

- describe the meaning of cognitive learning
- understand Convergent, Divergent, Critical, Problem Solving and Decision Making
- elaborate the meaning of Multiple Choice and Matching
- reproduce the Constructed-Response Assessment such as Completion, Short Answer and Essay Items.
- understand the meaning of affective learning
- perceive how affective learning will be assessed through attitude and values, interest, self-concept
- develop tools/techniques for the Performance- Based Assessment

### **4.3 COGNITIVE ASSESSMENT AND STUDENT LEARNING**

Cognitive learning is the mental action or process of acquiring knowledge and understanding through thought, experience and the senses. It encompasses processes such as knowledge, attention, memory and working memory, judgment and evaluation, reasoning and computation, problem solving and decision making, comprehension and production of language, etc. Human cognition is conscious and unconscious, concrete or abstract, as well as intuitive (like knowledge of a language) and conceptual (like a model of a language). Cognitive processes use existing knowledge and generate new knowledge.

It is important to understand the relationship between cognitive assessment and student learning, particularly in the context of determining a student's need for special education services. Defining intelligence can be rather complicated. Some define intelligence as it relates to the general interpretation of the global IQ as derived from intelligence tests, or achievement tests. Others claim that intelligence should be analyzed at a more specific level by examining each of the cognitive functions which make up the global IQ.

#### **4.3.1 Convergent and Divergent Thinking**

Guilford speaks of two kinds of thinking, namely Convergent and Divergent Thinking. What does one mean by Convergent thinking? To converge means to tend towards or meet in one point or value'. To diverge means to tend from a common point in different direction'. Convergent thinking is characterized by rigidity, conformity and unquestioning acceptance of authority. It is a stereotyped behavior. On the other hand, divergent thinking is a kind of healthy departure from the beaten track. It stimulates a questioning frame of mind and discourages blind acceptance. It is a goal-directed activity aimed at a destination one is only dimly aware of. One becomes venturesome and exploratory rather than being a slave to conventional mode of thinking.

Why do majority of teachers encourage convergent thinking mostly in class? Perhaps, it safeguards their ego and status. They find it easier to practice. This kind of teaching contributes to success in the present mode of examination where in pure recall-type questions predominate. Since very little time and opportunity would be provided for discussion or debate, the syllabus could be covered within the stipulated time. Such teachers are unimaginative and unproductive.

How does a teacher who promotes divergent thinking conduct his/her class? He tends to encourage independent thinking, suspend judgment and be tolerant toward those who differ from

him. He has an open mind and whenever he gives a definition he would also encourage students to redefine in a simpler language than what is presented in the text book. Students feel free to suggest ideas for discussion and not remain tongue-tied or insecure.

#### **4.3.2 Divergent Thinking Abilities**

Creative ability consists of several distinct abilities of divergent thinking. One of them is Fluency- the ability to come up with a large number of ideas or solutions or concepts or words in response to a given stimulus. The second is Flexibility – the ability to come up with a variety of ideas or solutions or techniques. The third is Originality – the ability to come up with useful ideas or solutions that others have not thought of. The fourth is Sensitivity to the unusual, to issues, feelings, anomalies or problems. The fifth is the ability to identify the Causes of a situation or a problem as well as the likely consequences of the situation.

#### **4.3.3 Critical Thinking**

Training children in the art of critical thinking or reasoning will be effective, limited of course by the natural intellectual endowments of children. Critical thinking is a general term that covers all thinking processes that strive to get below the surface of something: questioning, probing, analyzing, testing and exploring. It is not a negative term as such, although it can sound it. Critical thinking requires detective-like skills of persistence to examine and re-examine an argument, in order to take in all the angles and weigh up evidence on every side. To think critically is never to take something on ‘face value’ but to question and think independently about an issue, however ‘authoritative’ a writer or thinker may be.

There are several stages involved in critical reading:

- ❖ Identifying the author’s line of reasoning
- ❖ Critically evaluating the line of reasoning
- ❖ Identifying evidence in the text
- ❖ Evaluating the evidence
- ❖ Questioning surface appearances and assumptions
- ❖ Identifying the writer’s conclusions
- ❖ Deciding whether the evidence supports the conclusions

##### **a. Identify the line of reasoning**

Most academic writing you will read as a student will contain an argument. In academic writing, an argument is:

- A line of reasoning.
- An angle or point of view.
- A position that is being defended.
- A Case that is being made backed up by evidence and examples, leading to conclusions.

#### **b. Critically evaluate the line of reasoning**

Check whether the argument contains: Points and reasons in favour of the argument that is relevant, and contributes to it Points that follow each other logically false premise:

- A starting point that is not proven or backed up with evidence
- Flawed reasoning: false connections between points.

#### **c. Identify evidence in the text**

This is usually straightforward. Evidence can be in the form of:

- Statistics, examples, case histories.
- Findings from experiments or surveys,
- questionnaires or case studies Anecdote – personal stories and experiences

#### **d. Evaluate the evidence**

Some evidence is strong, but a lot can be weak when examined. Be careful to:

- Check the date of any research
- Check possible bias in the sources, organization agendas.
- Check that statistics are convincing – percentages can be used to make inadequate data look impressive Beware of words that sound like statistics

#### **e. Questioning surface appearances and assumptions**

As you study and re-read a piece of writing, keep trying to look below the surface', and question the agenda of the writer.

#### **f. Identify the writer's conclusions**

Conclusions are usually at the end, but can be stated at the beginning, or even in the middle, which makes them harder to spot Conclusions are usually indicated by 'trigger' words – 'therefore, so, hence, thus, it is clear that...' Or by imperatives – words indicating that something has to be done – 'must, should, need to...'

#### **g. Evaluate whether the evidence supports the conclusions**

Do the conclusions follow on logically from the evidence and reasoning given? Does the conclusion make too big a ‘jump’ away from the evidence? Do the conclusions use false reasoning, or twist the evidence to suit a general premise? Critical thinking questions – quick summary.

#### **4.3.4 Problem Solving**

An individual faces a problem when he finds obstacles in his attempt to reach a desired goal. If the goal could be reached easily then there is no need for any reasoning. Problem-solving is a mental process that involves discovering, analyzing and solving problems. The ultimate goal of problem-solving is to overcome obstacles and find a solution that best resolves the issue. The best strategy for solving a problem depends largely on the unique situation. In some cases, people are better off learning everything they can about the issue and then using factual knowledge to come up with a solution. In other instances, creativity and insight are the best options.

##### **i. Nature of Problem-Solving**

- Goal specific
- Deliberate and purposeful
- Attempts at the removal of interference
- Results in novel procedures or novel products

##### **ii. The Steps in Problem-Solving**

In order to correctly solve a problem, it is important to follow a series of steps. Many researchers refer to this as the **problem-solving cycle**, which includes developing strategies and organizing knowledge. While this cycle is portrayed sequentially, people rarely follow a rigid series of steps to find a solution. Instead, we often skip steps or even go back through steps multiple times until the desired solution is reached.

- **Identifying the Problem:** While it may seem like an obvious step, identifying the problem is not always as simple as it sounds. In some cases, people might mistakenly identify the wrong source of a problem, which will make attempts to solve it inefficient or even useless.
- **Defining the Problem:** After the problem has been identified, it is important to fully define the problem so that it can be solved.

- **Forming a Strategy:** The next step is to develop a strategy to solve the problem. The approach used will vary depending upon the situation and the individual's unique preferences.
- **Organizing Information:** Before coming up with a solution, we need to first organize the available information. What do we know about the problem? What do we not know? The more information that is available, the better prepared we will be to come up with an accurate solution.
- **Allocating Resources:** Of course, we don't always have unlimited money, time and other resources to solve a problem. Before you begin to solve a problem, you need to determine how high priority it is. If it is an important problem, it is probably worth allocating more resources to solving it. If, however, it is a fairly unimportant problem, then you do not want to spend too much of your available resources into coming up with a solution.
- **Monitoring Progress:** Effective problem-solvers tend to monitor their progress as they work towards a solution. If they are not making good progress toward reaching their goal, they will re-evaluate their approach or look for new strategies.
- **Evaluating the Results:** After a solution has been reached, it is important to evaluate the results to determine if it is the best possible solution to the problem. This evaluation might be immediate, such as checking the results of a math problem to ensure the answer is correct, or it can be delayed, such as evaluating the success of a therapy program after several months of treatment.

### iii. Problem-Solving Strategies and Obstacles

In cognitive psychology, the term problem-solving refers to the mental process that people go through to discover, analyze and solve problems. This involves all of the steps in the problem process, including the discovery of the problem, the decision to tackle the issue, understanding the problem, researching the available options and taking actions to achieve your goals. Before problem-solving can occur, it is important to first understand the exact nature of the problem itself. If you understand of the issue if faulty, your attempts to resolve it will also be incorrect or flawed.

There are a number of different mental processes at work during problem-solving. These include:

- Perceptually recognizing a problem
- Representing the problem in memory
- Considering relevant information that applies to the current problem
- Identify different aspects of the problem
- Labeling and describing the problem

#### **iv. Problem Solving and Education**

- ❖ Applying innovative Teaching Methods in class like, Brainstorming, co-operative & collaborative learning, group discussion or activity etc...
- ❖ Provide meaningful and practical problems in different subject areas
- ❖ Keep the level of motivations and the difficulty level of the problem moderate
- ❖ Provide the variety
- ❖ Provide the Practice
- ❖ Provide the self expression to generate ideas
- ❖ Provide incomplete solution to enhance curiosity
- ❖ Provide for healthy competition
- ❖ Provide conducive class environment
- ❖ Encourage scientific thinking
- ❖ Discussing current issues and social problems in the classroom.

#### **4.3.5 Decision Making**

Decision making is the process of making choices by setting goals, gathering information and assessing alternative occupations.

##### **a. Steps Involved In Effective Decision Making**

##### **Step 1: Identify the decision to be made**

You realize that a decision must be made. You then go through an internal process of trying to define clearly the nature of the decision you must make. This first step is a very important one.

##### **Step 2: Gather relevant information**

Most decisions require collecting pertinent information. The real trick in this step is to know what information is needed the best sources of this information, and how to go



about getting it. Some information must be sought from within you through a process of self-assessment; other information must be sought from outside yourself—from books, people, and a variety of other sources. This step, therefore, involves both internal and external “work”.

### **Step 3: Identify alternatives**

Through the process of collecting information you will probably identify several possible paths of action or alternatives. You may also use your imagination and information to construct new alternatives. In this step of the decision-making process, you will list all possible and desirable alternatives.

### **Step 4: Weigh evidence**

In this step, you draw on your information and emotions to imagine what it would be like if you carried out each of the alternatives to the end. You must evaluate whether the need identified in Step 1 would be helped or solved through the use of each alternative. In going through this difficult internal process, you begin to favor certain alternatives which appear to have higher potential for reaching your goal. Eventually you are able to place the alternatives in priority order, based upon your own value system.

### **Step 5: Choose among alternatives**

Once you have weighed all the evidence, you are ready to select the alternative which seems to be best suited to you. You may even choose a combination of alternatives. Your choice in Step 5 may very likely be the same or similar to the alternative you placed at the top of your list at the end of Step 4.

### **Step 6: Take action**

You now take some positive action which begins to implement the alternative you chose in Step 5.

### **Step 7: Review decision and consequences**

In the last step you experience the results of your decision and evaluate whether or not it has “solved” the need you identified in Step 1. If it has, you may stay with this decision for some period of time. If the decision has not resolved the identified need, you may repeat certain steps of the process in order to make a new decision. You

may, for example, gather more detailed or somewhat different information or discover additional alternatives on which to base your decision.

### **Check your Progress-1**

28. Bring out the Divergent thinking abilities.

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29. Describe the nature of Problem- Solving.

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30. Explain the term Decision Making.

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## **4.4 SELECTED-RESPONSE ASSESSMENT**

### **4.4.1 Objective Type**

To mitigate some of the evils of the essay type examinations, objective tests seem to be very useful. Modern educationists lay much stress on this type of tests to supplement the traditional type of tests. Objective tests are of a large variety. An objective type of test item is one which the response will be objective. Objective type test item broadly classified into two: Supply type (Recall Type - The respondent has to supply the responses) and Selection type (Recognition Type - The respondent has to select the responses from among the given responses).

#### **i. Objective Type – 4 Types**

- True – False Items (Alternate Response Type)
- Multiple Choice Items
- Matching Type Items and
- Completion Type Test Items

### ***ii. Advantages of Objective Type Items***

- A large amount of study material can be tested in a very short period time
- Economy of time.
- Objectivity of scoring.
- No bluffing
- It reduces the subjective element of the examiner to the minimum and
- If carefully planned, it can measure the higher mental process of understanding, application, analysis, prediction and interpretation.

### ***iii. Limitations of Objective type items***

- Difficulty in preparing good items.
- Problem of guessing.
- Problem of cheating.
- Inefficiency in testing complicated skills
- High printing cost and
- Emphasis on testing superficial knowledge.

### **4.4.2 Matching Items**

A matching item consists of two columns: one column of stems or problems to be answered, and another column of responses from which the answers are to be chosen. Traditionally, the column of stems is placed on the left and the column of responses is placed on the right. An example is given below.

Directions: Match the data gathering procedures in the item column on the left with the name of the data gathered in the response column on the right. Place your answer in the blank to the left of each procedure. Each answer may be used only once.

#### **Data Gathering Procedure**

#### **Type of Data**

- |   |                               |
|---|-------------------------------|
| (a) 1. Administer two forms of a test                 | a. Coefficient of equivalence |
| (d) 2. Estimate reliability on the basis of item data | b. Coefficient of stability   |
| (c) 3. Obtain odd-item and even-item scores           | c. Internal consistency       |
| (b) 4. Test then retest in one month                  | d. Rational equivalence       |

Matching items are extensively used for matching terms with definitions, names with achievements, events with dates, and so on. A variation on the basic matching item is to use a diagram, chart, graph or map containing the stems or list of problems, and the names of the parts or components as the list of responses. An example of this variation is shown below.

#### **Item Components**

- |   |                      |
|---|----------------------|
| (d) 1. The components of a multiple-choice item are a | a. Correct answer(s) |
| (b) 2. 1. stem and several foils.                     | b. foil(s)           |
| (b) 3. 2. correct answer and several foils.           | c. option(s)         |
| (b) 5. 4. stem and a correct answer                   | d. stem(s)           |
| (c) 6.  |                      |

Note that, in the above example, it is necessary to answer the multiple-choice item in order to answer the parent matching item. Note also that the responses (item components) in the list at the right have a (s) added to each response in order to eliminate singular-plural extraneous clues. Because of the nature of the matching task, names with events, for example, it is clear that matching items often measure recognition of factual knowledge rather than higher level mental processes. Here are some hints for writing matching items.

#### **4.4.3 Short Answer Type**

- A question requiring three value points at most may be defined as a short answer question.
- Value points diminish the subjectivity.
- Help in ensuring wide coverage of content.

#### ***Advantages of Short answer Type Items***

- Large portion of the content can be covered in a test.
- No opportunity for guessing.
- Easy to construct, because it measures a relatively simple outcomes.
- It can be made quit objective by carefully fixing the value points.
- Useful in evaluating the ability to interpret diagrams, charts, graphs, etc.
- If carefully prepared, deep level objectives understanding, application and problem solving skill can be evaluated.

### ***Limitations of Short answer Type Items***

- It is more subjective than the objective type of items.
- It may encourage student to memories fact and develop poor study habits.
- Mechanical scoring is not possible

### **4.4.4 Essay Type**

- It is free response test item.
- Help in ensuring a wide coverage of content and variety of objectives.
- Help in evaluating complex skills.

### ***Advantages Essay Type Items***

- Easy to prepare.
- Useful in measuring certain abilities and skills.
- Permit the examinee to write down comprehensively what he knows about something.
- Promote originality and creative thinking.
- Possibility of guess work can be eliminated.
- Reduce chance on the spot copying.
- Low printing cost.

### ***Limitations of Essay Type Items***

- Minimum validity.
- Lack of reliability.
- No objectivity.
- Rote memory is encouraged.
- It is a time consuming test item.

### **Check your Progress-2**

31. What are the different types of Objective Type Tests Items?

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32. State the limitations of Short Answer Type Items.

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33. Give a note on 'Essay Type Items'.

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## **4.5 AFFECTIVE LEARNING**

Affective domain describes the way people react emotionally and their ability to feel other living things' pain or joy. Affective objectives typically target the awareness and growth in attitudes, emotion and feelings.

### **4.5.1 Attitude**

#### **a. Meaning and Definition of Attitude**

An attitude is a variable which directly observed, but it is inferred from overt behaviour both verbal and non-verbal responses. In more objective term the concept of attitude may be said to connote response tendency with regard to certain categories of stimuli. In actual practice the term 'attitude' has been most frequently associated with emotionally toned responses. The deep rooted feelings are the attitudes which cannot be changed easily.

“An attitude is defined as a tendency to react in certain way toward a designated class of stimuli or an object”.

#### **b. Opinion and Attitude**

Opinion is sometimes differentiated from attitude, but the proposed distinctions are neither consistent nor logically defensible. More often the two terms are used interchangeable but psychologically these two terms are altogether different.

- (i) Attitude of an individual is generally very rigid it cannot be easily changed, but opinion can be revised or changed easily.
- (ii) Attitude of an individual can be graded easily but opinion cannot be graded, the opinions are usually in the form of yes or no.
- (iii) Attitude of individual is considered as human trait or important variable, is measured by rating scales. Opinion is not considered as trait or variable, is areas concern. Opinion air is the tool to call the opinion of the individuals polling.
- (iv) How an individual feel or what he believes is his attitude, but difficult to measure and describe. We have to depend for his attitude, what the individual says as to his beliefs and feelings. Really the expression is the opinion. Total opinion forms an attitude.

- (v) The term opinion is used more often is refer to judgments and knowledge, where as the term 'attitude' is more connotative of belongs, feelings and preferences.
- (vi) The opinions, are usually verifiable than attitudes.

### **c. Measurement of Attitudes**

“Psychometrics scaling procedures are described all represent technique for placing a set of stimuli on a numerical scale, seeking in every instance too much to reach the highest level of measurement possible under the experimental ‘improved conditions’.

**-Guilford and others (1954)**

‘Psychometric scaling technique called successive intervals’. Each of the stimuli under consideration is placed into one of a limited number of intervals ordered along some continuum.

## **4.5.2 Values**

### **a. Meaning and Definition of Values**

The term ‘value’ is more sociological concept. The values fall in the realm of ethics, economics, aesthetics and religion. They exist as they are experienced in human minds and translated into human actions. The value determines the direction of human actions. Thus values are the significant determinant for individual differences. The values are related to feelings and beliefs of an individual which are deep rooted.

The value is defined in terms of sentiments and emotions likes and dislikes etc.

“Values seem to reside in the objects just as truly as do colour, smell temperature size and shape”.

– C.E.M. Joad (1942)

### **b. Characteristics of values**

The following are the characteristics of value-

- It is the satisfaction of human wants.
- It is the psychological needs of a person.

- It is a generalized and that guides individual behavior and it is an organized ends.
- It is an outcome of human choices among the competitive human interest.
- It is the psychic-energy invested in the personality of an individual.
- It is the real determinant of human behavior and relationship between subject and object.
- It is socially approved desires and goals, and experiences of life which guides the actions and behavior are known as values.

### **c. Test of Values**

A test of values, in contrast to one of attitudes, claims to measure generalized and dominant interests. The study of values (Allport and others), is based upon six categories of values, as classified by spranger (type of men). The items are intended to measure the relative prominence of the subject's interests, for the purpose of classifying his values. The six categories of values are-

1. Theoretical values
2. Economic values
3. Aesthetic values
4. Social values
5. Political values and
6. Religions values

According to this classification-

1. The dominant interest of the theoretical man is discovery of truth.
2. The economic is interested in what is useful for him.
3. The aesthetic values form and harmonize most.
4. The highest value the social type is love of people.
5. The political man is interested primarily in power, and
6. The religious man places the highest value on unity.



#### **4.5.4 Interest**

Interest is the integral part of one's personality. It is an acquired trait from the environment. Personality is a wider term including all the psycho-physical dispositions, behaviours, views, Interests and attitudes of an individual. Adjustment has some relevance with interests. According to Kelly, interests of an individual really important information about the make-up of his personality. Interests are one of the determinants of the individual differences.

##### **i. Definition of Interest**

The following are some important definitions of the term interest.

“An interest is a tendency to become absorbed in an experience and to continue it”.

- **Bingham, W.V.**

##### **ii. The following are the main characteristics of Interest**

1. Interests are not necessarily related to ability or aptitude.
2. Interest can be hereditary as well as acquired from environment, through the interests are mainly acquired.
3. Interests are fairly stable, cannot be changed easily.
4. Interests of an individual resemble with his parents or family interests.
5. Interests are the aspects of personality of an individual.
6. Interests are related to aptitudes and achievements.

##### **iii. Measurement of Interest**

There are various methods and tools of measuring personality such as observation, interview, check list questionnaire and inventories.

The following are most popular interest inventories-

1. Strong Vocational Interest Blank by E.K. Strong
2. Kuder Preference Record, and
3. Occupational Interest Inventory.

The brief description of these instruments has been provided in the following paragraphs:

#### **a. Strong Vocational Interest Blank**

This interest blank was designed by E.K. Strong in 1919. It consists of 420 items concern with various occupations, school subjects, amusements, activities of people etc. It has been applied to persons in various professions such as law, medicine, teaching and engineering etc., According to strong some interests are common to all these professions. It is not concerned with ability. It is applicable for adults. It is available in four forms for men, women, students and those who have left school long back. About 40, 50 minutes are given for taking the test. The reliability is about 0.80 validations it quite difficult. E.K. Strong validated after 16 years who had taken test. The norms have been developed for the inventory.

#### ***Limitations***

The accuracy of statements made by the subject cannot be tested. There is the problem of stability of interests as it is an acquired trait, the interests change at the different stages of development. It does not indicate the success in the occupation.

#### **b. Kuder Preference Record**

The Kuder Preference Record has been developed for high school and college students. Each item of this inventory consists of three preferences such as- (a) Study Physics (b) Study of Musical Composition and (c) Study Public Speaking. It consists of 198 items in all, each item has three preferences. Preference is measured in nine fields mechanical, scientific, computational, artistic, literacy, persuasive social service and clerical etc. It has high reliability index 90. Reference in this record can be compared with the strong vocational interest blank. Interest inventories are used in the classification or selection of individual for different occupations. It means that individual difference with regard to interests is useful for vocational guidance as well as educational guidance and counseling purpose. It provides the basis for selection of individuals for different jobs. It has the administrative function. Information about the interests of students is much more useful for teachers in school. In selecting the study subjects after delta class, interests of the students are basic for their choices.

### **c. Occupational Interest Inventory**

Occupational Interest Inventory is designed to be used in a wide spectrum of career guidance activities. It helps candidates choose an occupation, plan their career, and grow as professionals in the workplace.

The assessment, which is based on the RIASEC model, measures levels of interest in 12 domains and matches the candidate's profile with a list of 80 occupations across various sectors and fields. In this way, it helps to pinpoint the most suitable profession for them.

The report provides a constructive analysis, helping the evaluator to initiate a meaningful dialogue with the candidate, understand their vocational interests, and match their profile with suitable career options.

#### **i. Orientation and mobility**

Occupational Interest Inventory can be a point of reference for career guidance processes, helping candidates to make informed decisions about their career. For those considering a career transition, it provides good insight into their job preferences. The combined approach of RIASEC profiles opens the field of possibilities to a deeper exploration of an individual's aspirations by selecting occupations that align with their personality.

#### **ii. Skills assessment/training courses**

Occupational Interest Inventory facilitates a dialogue between the individual and the assessor and, as of such, is an indispensable tool for skills assessments and trainings. For training courses, it can help trainers to optimise resources by identifying individuals' learning styles and the environment most conducive to their development.

#### **iii. Recruitment**

When combined with a personality questionnaire, Occupational Interest Inventory can be an integral part of your recruitment process. Through an assessment of interests and professional aspirations, recruiters can assign the positions and responsibilities that would be most stimulating and rewarding for employees.

### **4.5.4 Self-concept**

One's **self-concept** (also called **self-construction**, **self-identity**, **self-perspective** or **self-structure**) is a collection of beliefs about oneself that includes elements such as academic performance, gender roles, sexuality and racial identity. Generally, self-concept embodies the

answer to "Who am I?". Self-concept is a cognitive or descriptive component of one's self (e.g. "I am a fast runner"),

Self-concept is made up of one's self-schemas, and interacts with self-esteem, self-knowledge and the social self to form the self as whole. It includes the past, present, and future selves, where future selves (or possible selves) represent individuals' ideas of what they might become, what they would like to become, or what they are afraid of becoming. Possible selves may function as incentives for certain behavior.

### **Check your Progress-3**

7. Define Attitude.

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8. What are the most popular interest inventories?

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9. Give the meaning of Value.

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## **4.6 OBSERVATION**

In school, during the school hours, the students undergo various institutional environments. During this time the students behave differently. Observation is useful in evaluating students' behavior in different situations. In English we use the phrases to see and to observe. To see means to study the external features of the body whereas to observe. To see means to study the external body feature along with the internal features. This process of observation is simple as far as it is concerned with the gathering of information about the behavior and personality of the students.

Observation helps the observer to observe the activities of students, class-behaviour, and hence ascertain the emotional development, mental development and maturity etc. During observation care should be taken that the person who is observed is unaware that he is being

observed. Thus the observation should be out of the knowledge of person. Further care should be taken that the behavior which is to be observed should be pre-decided. At a time one person and one characteristic should be observed. Observation can be direct or indirect, controlled or uncontrolled, known or unknown.

#### **4.6.1 Types of Observation**

Observations can be categorized as controlled observation and uncontrolled. The observation done in the laboratory is called controlled observation. Controlled observation means the observation is done with the knowledge of the person means that the person who is being observed is aware that he or she is being observed by the observer. Controlled observation thus means conscious observation. Uncontrolled observation means taking observation without the knowledge of person. Uncontrolled observation is thus conducted in a natural situation or condition.

#### **4.6.2 Steps of Observation**

Following are the steps for observation:

- Planning
- Execution
- Recording and interpretation

##### **❖ Planning**

The characteristic, topic or the thing to be observed is decided in this stage. Whether it is group observation or personal observation, when and how many times the observation would be done, the tools useful for recording the observation etc. is also decided here. The specific type of training, if necessary for observer, is provided. These training are useful during interpretation. Who will be doing observation or the observer is also pre decided.

##### **❖ Execution**

The arrangement for observation is done. The necessary arrangement for the observation as such the natural or artificial arrangement is done. Then after that environment of that opportunity is given so that the person is motivated to behave in some manner and that behavior is observed. Moreover the type of observation, its time and place for observation is also decided.

## ❖ **Recording and Interpretation**

If the tools or instruments are ready then observation turns a fast process. The observation or the recording is hereby evaluated and interpreted.

### **4.7 CHECKLIST**

It is one of the specific instruments for evaluation. Checklist is in the form of questionnaire. In this the answers of the questions are given. Checklist can be used for self-evaluation or for other's evaluation. It exhibits if the student has any particular characteristics or not and thus helps in the evaluation of the students.

#### **4.7.1 Characteristics of Checklist**

Checklist is used for evaluation of self and others. It is used as an instrument of observation. It involves questions and its answers. It involves signs by the respondent. It involves the characteristics about a particular subject to be evaluated.

#### **4.7.2 Construction and Application of Checklist**

The first horizontal line of the check list is used to write the name or number of the subject under observation. The characteristics of the subject or thing to be evaluated are arranged in vertical column of the evaluation sheet with the corresponding blank options to place the tick mark in the adjacent columns. Then the characteristics present in the subjects under observation are decided and if that characteristic is present in the subject then the tick mark is placed in that column. Then after the frequency of all tick mark is counted and marks are given to students on the basis of predefined norms or standards. Then the percentage, mean, median or correlation is used.

#### **4.7.3 Uses of Checklist**

1. It is useful for survey and research.
2. The amount of characteristics or traits of subjects can be known.
3. It is helpful to give the appropriate guideline to the subjects.
4. To know the developmental direction of the specific behavior pattern check list is used.
5. It is useful for self-evaluation and other's evaluation.

#### **4.7.4 Limitations of Checklist**

1. As only sign is used in checklist therefore no other options are found.
2. It is subjective and biased.
3. It is difficult to evaluate the personality of student or adjustment capacity through checklist.

#### **4.7.5 Suggestions for the Effective Use of Checklist**

1. The suggestions and characteristics should be short and clear.
2. The appropriate space should be given to place the tick mark in front of every characteristic.
3. The evaluation should be done without partiality or bias.

### **4.8 RATING SCALE**

By observing the various school and college activities we find change in behavior of students. Over and above that various personal characteristics are also observed. These characteristics separate the human behavior. The teacher observes such type of behavior of students by his insight and intelligence and hence evaluates the personality of the student. If this behavior of the students is evaluated through rating scale then it becomes more reliable. The technique of observation or the tool with the help of which the researcher or observer observes externally the amount of the various characteristics developed in a person and takes a note of it methodologically is called rating scale. Here the evaluation is done in relation to their opinion. Such a tool or instrument which converts the opinion into numbers is called rating scale. It can be used to evaluate the personality traits, creative skills, individual or social adjustment etc.,

#### **4.8.1 Types of Rating Scales**

The following are the main scales-

- Numerical Scales,
- Graphic Scale,
- Standard Scales,
- Check Lists,
- Forced Choice Scale,
- Ranking method and Q-Sort-method.

### **i. Numerical Scales**

One of the simplest scales to construct and easiest to use, is the numerical rating scale. This type of tool usually consists of several items each of which names or describes the behavior to be rated, and then offers as alternative responses a series of numbers representing points along the scale. This simple numerical scale does have face validity and therefore seems to be widely accepted. It is more subjective or bias tool.

### **ii. Graphic Scale**

If the format of the rating scale is such that the characteristics to be rated is represented as a straight line along which are placed some verbal guides, the tool is referred to as a graphic rating scale. It is easy to construct and easy to administer therefore it is widely used of all the specific types of rating scales, but it is less reliable measure.

### **iii. Standard Scale**

In the standard scale approach an attempt is made to provide the rater with more than verbal cues in describe various scale points. Ideally, several samples of the objects to be rated are included each with a given scale value which have been determined in experimental studies prior to the use of the scale.

### **iv. Check Lists**

An approach which is widely popular because it is simple to administer and still permits wide coverage in short time is the behavior check list. It contains a long list of specific behaviors which supposedly represented individual differences, and rater simply checks whether the item applies. The behavior index of individual is obtained by summing up the items, which have been checked. The modified check list or for reliable result, it is essential for each item as applicable or not applicable or not known.

### **v. Forced Choice Scale**

One of the most recent innovations in the rating scale area has been developed a forced choice technique which has been designed to overcome the major difficulties faced on with earlier techniques. In a forced choice rating the rater is required to consider not just one attribute, but several characteristics all at one time. Assuming that relevant item is difficult for a better to



distinguish from which is not predictive if both are equally favourable to the person, the format requires that only few of several behaviours listed in each item be selected as applicable.

For example:

Item form forced choice rating scale.

- |        |   |
|--------|---|
| Fair:  | 1.(a) Insists upon his subordinates being peruse exact.<br>(b) Stimulate associates to be interested in their work. |
| Unfair | 2. (a) Allows him to become burdened with detail.<br>(b) Does not point out when work appropriate statement.        |

Rater is asked to select one which is most appropriate statement.

#### **vi. Ranking Method**

It is not possible that rater can accurately judge equivalent distances at various points along the scale. Under these conditions a ranking method which requires only that subjects who are being rated to be placed in order of each trait can be used. This approach is essential for large number of persons are to be rated. The raking approach has the advantage of forcing the judge to make a definite discrimination among these rates by eliminating the subjective differences faced by the judges, second advantage that group ranking is uniform.

#### **vii. Q Method**

Another relative ranking method is so called Q-Sort developed by Stephenson 1953. It is one of the best approaches to obtain a comprehensive description of an individual while ranking method gives the comprehensive friction of a group of the individuals. Therefore Q-Sort is widely used for rating person's school or one the hob for individual guidance.

#### **4.8.2 Importance of Rating Scale**

- Any characteristic can be measured through rating scale.
- It is helpful to evaluate the behaviour which other tools can hardly deal with.
- Abstract characteristics can be evaluated by rating scales.
- It is helpful to personality or the social development of person.
- The level of each characteristic of each student of the class can be known.
- It is helpful to deliver all the necessary information related to the progress of students.

- The rating scale is also useful for the measurement of other methods or techniques.
- Within less time more opinions can be obtained.

#### **4.8.3 Limitations of Rating Scale**

- The evaluation being totally based on observation, the bias, liking, disliking, beliefs and assumptions etc., of the evaluator are the hindering factors for unbiased evaluation.
- The unawareness about the characteristics leads to the wrong observation.
- If large number of behavioral evaluation is to be done then the evaluator being bored of the tick mark generalizes the results.

### **4.9 INTERVIEW**

“Interview is a purposeful conversation”.

- **John Darle**

“Interview means a serious conversation which is done by some purpose (Goode and Hatt)”. Interview means communication or conversation between two persons initiated by interviewer for collecting the information about research keeping in mind the objectives of the interview. Here the information is collected directly by verbal communication between two or more persons and the responses of the respondents are noted. It is a purposeful and serious conversation. The important aspect of interview is establishment of intimacy and to get response from respondent. Thus, the interview is a process of communication or interaction in which the respondent delivers the required information to the interviewer face-to-face. It is used effectively to collect the useful information in many research situations.

When the researcher is extremely conscious about asking the questions in his presence to exhibit his personal interactive objectives, the researcher uses this process of questioning which is called interview. Here the information is collected from the people verbally with their physical presence. The responses of the respondent are then collected by the interviewer in a separate sheet. It can be conducted by the interviewer in person or in group. When the interview is conducted in group, the size of the group should not be so large that it inhibits participation of most of the members and at the same time it should not be so small that it lacks substantially

greater converge than in the individual interview. The optimum size is approximately 10-12 persons. Social, intellectual and educational homogeneity is important for effective participation of all group members. A circular seating arrangement, with the interviewer as one of the group, is conducive to full and spontaneous reporting and participation. The interview can be conducted one or more times as per requirement. As a tool for research interview is used as formal and informal, directional and non-directional interview.

#### **4.9.1 Characteristics of Interview**

- It is social interaction
- It is a sincere method
- It is direct purposeful conversation.
- It involves various direct involvements of interviewer and respondent.
- It involves various forms of questions to be asked to the respondent.
- It is a purposeful and serious conversation.
- It involves establishment of intimacy between the interviewer and respondent.
- It is a process of communication or interaction.
- It involves the note of responses delivered by the respondent.
- It involves the face-to-face involvement of the respondent and the interviewer.
- It can be conducted one or more time.
- It is a tool to collect the useful information in many research situations,
- It can be in person or in group.
- It exhibits the response excitement by the respondent.
- It is a behavioral method.
- It indicates social, intellectual and educational homogeneity.
- It may be formal, informal, directional or non-directional interview.

#### **4.9.2 Nature of Interview**

1. It is in the form of individual or group interview.
2. It is directional or non-directional interview.
3. It is formal or informal interview.

### 4.9.3 Types of Interview

Interviews are helpful as well resourceful in the research study especially in the personal study, case study, trend studies, historical research, experimental problems etc., to collect the relevant important information.

#### **Following are the types of interview:**

1. **Diagnostic Interview:** The problems related with education like adjustment, self-concept, anxiety etc. can be known through diagnostic interview. It may be personal or in group. It consists of variety of questions necessary for the diagnosis. The respondent is questioned and thus diagnosis is done.
2. **Remedial Interview:** Such type of interview is conducted to resolve the diagnosed related problems for their remedy. It may be personal or in group. It consists of variety of questions necessary for the remedy. The respondent is questioned and thus remedial work is planned.
3. **Structured Interview or Controlled Interview:** In this type of interview the subject matter, questions and methods are pre-decided and fixed. The order of the questions and words are pre-decided and asked accordingly. Thus the content, method, number of question, words and the order of questions are fixed in this type of interview. The questions and answers are manipulated and controlled.
4. **Unstructured Interview:** In this type of interview the attitude, aspirations, beliefs and characteristics of respondent are used to collect the information. It is uncontrolled and flexible whereby pre-decided or pre-organized orders of questions are not emphasized. Here the interview is un manipulated and flexible. To get information about the attitudes, motivations, characteristics and beliefs of the respondent the respondent is questioned in the way he feels comfortable. Unlike structured interview the respondent can give free responses.
5. **Individual and Group Interview:** Here as per the need the individual or group interviews are conducted. Individual interviews are conducted to evaluate the behavior, attitude or development of the individuals whereas group interviews are taken for specific or general problems etc.
6. **Directional Interview:** For fulfilling the needs related to interaction process, uncontrolled interviews are taken. As such subject matter and the area of checking are

- accurate and pre-organized and as it is used for getting related information they are considered as directional. Here interviewer is independent of form and order of question to be asked in interview means that the interviewer is free to ask any question of any form and in any order.
7. **Non-Directional Interview:** Non-directional interviews are included in psychoanalysis and in the field of medicine. There is freedom to show sympathy to the respondent by the interviewer. The respondents are motivated towards the subject matter. There is no pre-decided structure. In case of any doubt the answer of the respondent can be modified. It is also used to know the attitude, beliefs, ideas and feelings etc. In this type of interview free from of questions can be asked to find the solution of the problem. This type of interview being irrespective of order or sequence of questions, the interviewer should have talent of asking the appropriate questions. The respondent can be motivated about the subject of research.
  8. **Focused Interview:** Focused interview focuses on events or occasions or the known situation of the respondent. Prior to the interview, the interviewer does the analysis and accordingly the questions are decided by during the interview, if it is required the pre-decided hypothesis can be rejected or can be changed. Interviewer interprets and evaluates the excitement of excited samples. Focused interview may be structured or un-structured.
  9. **In depth Interview:** Through the in depth interview the amount of the experience and characteristics of respondent can be decided. Here exciting situations are motivated and concentrated over previous experience. To get the relevant and in depth information the intimacy between the interviewer and the respondent is established. Here the statements are repeated, misunderstanding is created, description of situation is done or situations are compared in different ways to get the in depth information from the researcher.

#### **4.9.4 Steps of Interview**

For interview the talent, patience and potential of interviewer, organization of interview and the intimacy between the respondent and the interviewer are of much importance. To conduct an interview, it should be carefully planned and designed whereas the interviewer, it

should be skilled and able to develop intimacy with the respondent. The steps of interview include preparation of interview, execution of interview, note taking and analysis of the information. Following are the steps of interview:

➤ **Preparation for Interview:** Preparation for interview includes the objectives of interview and preparing the interview register. It is actually the mental preparation of the interviewer for the interview. It includes thinking for the objectives, type of interview, number of interviewer, position, place and time of interview etc. by the investigator.

➤ **Objectives of interview:** In this step, the general aims of research are converted into specific objectives. The area, information to be collected, the respondents and the type of interview is decided according to objective.

➤ **Prepare an Interview Register:** While preparing for the interview register the objectives of research are used to frame the questions. The research problem, related variables and the samples are considered. The information of good questions is based on subject matter, inspiration, realities, attitude, expectation of information and the intellect of interviewer and his rapport to develop relations. These questions can be objective or subjective, specific or general, fixed answer or free of giving any answer etc. Proper training, guidance and experience assure a good interview. It is a chain of appropriate questions and answers. The answers to the effective questions depend on the content, motivation, attitudes, expectation of information, time of interview and ability of the interviewer to establish the intimacy. The responses can be objective or subjective, special or general, free response or restricted.

➤ After the careful evaluation and critical thinking of the above aspects the appropriate types of questions are planned and a register is prepared whereby the investigator can use the appropriate type of questions. It can be in the form of questions, fill in the blanks, rating scale, checklist etc. The responses can be worked out accordingly.

➤ **Execution of Interview:** The execution of interview means conducting the interview. As per the preplan whether be it the personal or group interview, before starting the interview it is necessary to disclose the personal identity and the objectives and type of interview. The investigator should bear the tape recorder, camera, if necessary and the interview register. The

instructions, if any and necessary is delivered to the respondents. The execution of interview included establishing the rapport and eliciting information.

➤ **Establishing Rapport:** To get the necessary, relevant, important and all the information related to the subject it is necessary to gain the confidence of respondent and thus leading towards a good and successful interview. It is necessary that the interviewer should be polite, well dressed, cool, calm, patient, decent and capable of questioning and must bear good understanding. The investigator should himself be clear with the questions and their responses and the objectives of interview. The investigator should be skillful, positive, joyous, unbiased, capable, and free of any rational and bear the attitude of sympathy thus establishing a good rapport with the respondents.

➤ **Seeking the Information:** In pre-planned series asking appropriate questions without hurting the feelings of respondent and getting necessary and relevant information is important hence care should be taken that if in any case the respondent gets distracted of the point then those points should be flexible and the respondent is not bored of the interview and thus the information could be obtained.

➤ **Note taking:** The final step of the interview with the respondent used a paper sheet, pre-designed answer sheet, tape recorder or video recorder as per the requirement. Information is then minimized through analysis. To note the complete information from the respondent various activities, skill and talent could be used.

➤ **Analysis of the collected Information:** In this step the investigator does the assessment of the respondent's view as per the pre-decided structure. Here the information provided by the respondent is analysed and transformed into specific group or class or category. Then with reference to the objectives of research the analysis and interpretation of the data is done.

#### **4.10 PERFORMANCE BASED ASSESSMENT**

Direct, systematic observation and rating of students' performance of an educational objective, often an ongoing observation over a period of time and typically involving the creation of products. The assessment may be a continuing interaction between teacher and student and should ideally be part of the learning process. The assessment should be a real-world performance with relevance to the students and learning Community.

Assessment of the Performance is done using a rubric or analytic scoring guide to aid in objectivity. Performance based assessment is a test of the ability to apply knowledge in a real life setting. Evaluation of the product of learning experiences can also be used to evaluate the effectiveness of teaching methods.

**Stiggins:**

Defines this Assessment as used of performance criteria to determine the degree to which a student has met an achievement target. Important elements of performance based assessment include clear goals or performance criteria clearly articulated and communicated to the Learner; the establishment of a sound sampling that clearly envisions the scope of an achievement target and the type of learning that is involved. Attention to extraneous interference and establishment of a clear purpose for the data collected during the assessment before the assessment is undertaken, keeping in mind the needs of the groups involved (teachers, Students, Parents, etc.).

#### **4.11 RUBRICS AND ITS IMPORTANCE**

The word 'rubric' comes from the Latin word for 'red'. The online Merriam-Webster dictionary lists the first meaning of *rubric* as "an authoritative rule" and the fourth meaning as "a guide listing specific criteria for grading or scoring academic papers, projects, or tests." A rubric is a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria. It should be clear from the definition that rubrics have two major aspects: coherent sets of criteria and descriptions of levels of performance for these criteria.

The genius of rubrics is that they are descriptive and not evaluative. Of course, rubrics can be used to evaluate, but the operating principle is you match the performance to the description rather than "judge" it. Thus rubrics are as good or bad as the criteria selected and the descriptions of the levels of performance under each. Effective rubrics have appropriate criteria and well-written descriptions of performance.



### ➤ Purpose of Rubrics

Like any other evaluation tool, rubrics are useful for certain purposes and not for others. *The main purpose of rubrics is to assess performances.* For some performances, you observe the student in the process of doing something, like using an electric drill or discussing an issue. For other performances, you observe the product that is the result of the student's work, like a finished bookshelf or a written report. Some common kinds of school performances that can be assessed with rubrics. This by no means covers every possible school performance. It is just meant to help you think of the types of performances you might assess with rubrics.

#### **Check your Progress-4**

1. State the characteristics of Check List.

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-----

2. Write a note on 'Structured Interview'.

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-----

3. What do you mean by Rubric?

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#### **4.12 LET US SUM UP**

So far you have learnt the meaning of cognitive assessment and the way in which one thinks differ from one to another that refers to convergent, divergent, critical, problem solving and decision making. There is selected response assessment and construct response assessment which also differ on the nature of the question such as Multiple Choice and Matching and completing the sentence, short answer and essay type. The present chapter also dealt with assessment of affective learning in terms of attitude and values, Interest and self –concept. You have also seen tools that are used for assessment such as Observation, Interview, Rating Scales, Check Lists and Inventories etc.

#### 4.13 ANSWERS TO ‘CHECK YOUR PROGRESS’

The abilities of divergent thinking are Fluency, Flexibility Originality, Sensitivity and ability to identify the Causes of a situation or a problem as well as the likely consequences of the situation.

1. Nature of Problem-Solving are

- Goal specific
- Deliberate and purposeful
- Attempts at the removal of interference
- Results in novel procedures or novel products

2. Decision making is the process of making choices by setting goals, gathering information, and assessing alternative occupations.

3. The different types of Objective Type Test Items are

- True – False Items (Alternate Response Type)
- Multiple Choice Items
- Matching Type Items
- Completion Type Test Items

4. A short answer type item is more subjective than the objective type of items, it may encourage student to memories fact and develop poor study habits and mechanical scoring is not possible.

5. Essay type item is free response test item, help in ensuring a wide coverage of content and variety of objectives and help in evaluating complex skills.

6. “An attitude is defined as a tendency to react in certain way toward a designated class of stimuli or an object”.

7. The following are the most popular interest inventories-

1. Strong Vocational Interest Blank by E.K. Strong, 2. Kuder Preference Record and 3. Occupational Interest Inventory.

8. The term ‘value’ is more sociological concept. The values fall in the realm of ethics, economics, aesthetics and religion.

9. Checklist is used for evaluation of self and others and used as an instrument of observation. It involves questions and its answers, signs by the respondent and characteristics about a particular subject to be evaluated.
10. In this type of interview the subject matter, questions and methods are pre-decided and fixed. The order of the questions and words are pre-decided and asked accordingly. The questions and answers are manipulated and controlled.
11. A rubric is a coherent set of criteria for students' work that includes descriptions of levels of performance quality on the criteria.

#### **4.14 UNIT END EXERCISES**

- Explain Convergent and Divergent Thinking
- Describe the critical thinking
- Give the meaning, nature and steps of Problem solving
- Discuss the meaning and steps involved in decision making
- Explain the Selected-Response Assessment such as Objective Type, Matching Items, Short answer type and Essay type
- Enumerate the Meaning and definition of attitude
- Give the measurement of Interest
- Bring out the meaning, definition and Test of values.
- Describe the meaning, types, steps and importance of Observation
- Explain the meaning, Characteristic, construction and uses of Checklist
- Enumerate the meaning, types and importance of rating Scale
- Discuss the meaning, Characteristics, Nature, Types and Steps of Interview
- State the Performance Based Assessment
- Give the Rubrics and its Importance and purpose

#### 4.15 SUGGESTED READINGS

- **Schraw, G., and Robinson, H. D. (2011).** *Assessment of higher order thinking skills.* Charlotte, NC: Information Age Publishing.
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- **Stark, J. S., and Thomas, A. (1994).** *Assessment and program evaluation.* Needham Heights, MA: Simon and Schuster.
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## **UNIT V**

# **PLANNING, CONSTRUCTION, ADMINISTRATION AND REPORTING OF ASSESSMENT**

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### **STRUCTURE**

#### **5.1 INTRODUCTION**

#### **5.2 LEARNING OBJECTIVES**

#### **5.3 INSTRUCTIONAL OBJECTIVES (IO)**

#### **5.4 LEARNING OBJECTIVES**

#### **5.5 ASSESSMENT OBJECTIVES (AO)**

##### **5.5.1 Oral Test**

##### **5.5.2 Written Test**

#### **5.6 ACHIEVEMENT TEST**

##### **5.6.1 Major steps involved in the construction of achievement test**

#### **5.7 TYPE OF TEST ITEMS**

##### **5.7.1 Objective Type**

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#### **5.8 ADMINISTRATION AND REPORTING OF ASSESSMENT**

##### **5.8.1 Administration**

##### **5.8.2 Types of Administration**

#### **5.9 ITEM ANALYSIS**

#### **5.10 ITEM RESPONSE ANALYSIS**

#### **5.11 ASCERTAINING STUDENT NEEDS**

#### **5.12 IDENTIFYING STUDENT INTEREST**

#### **5.13 FEED FORWARD FOR IMPROVING LEARNING**

#### **5.14 REPORTING STUDENT PERFORMANCE**

##### **5.14.1 Formal Reports**

##### **5.14.2 Informal Reports**

##### **5.14.3 Progress Report**

##### **5.14.4 Cumulative Record**

##### **5.14.5 Profile**

##### **5.14.6 Open House**

#### **5.15 USING THE FEEDBACK FOR REPORTING TO DIFFERENT SHAREHOLDER**

##### **5.15.1 Students**

##### **5.15.2 Parents**

##### **5.15.3 Administrator**

#### **5.16 USE OF FEEDBACK FOR TEACHERS' SELF IMPROVEMENT**

##### **5.16.1 Get written feedback**

##### **5.16.2 Self Reflection**

##### **5.16.3 Curriculum design**

#### **5.17 LET US SUM UP**

#### **5.18 ANSWERS TO 'CHECK YOUR PROGRESS'**

#### **5.19 UNIT END EXERCISES**

#### **5.20 SUGGESTED READINGS**

## **5.1 INTRODUCTION**

Planning is very important for any activity to do it effectively. Planning is helpful to fulfill one's objectives framed to be achieved. A teacher is expected to make a plan while doing his activities such as Instruction and assessment and they must plan what will be the learning objectives. The present study deals with instructional, learning and assessment objectives. It also elaborates different types of assessment patterns such as oral tests and written tests; open book examination and its purpose. Construction and selection of items and how it could be drawn as best items through following certain procedures also enlightened here. Reporting the performance of the students through different records has been discussed in this chapter. Feedback from different stakeholders like students, parents and administrators and its impact on the performance are dealt in this chapter.

## **5.2 LEARNING OBJECTIVES**

After learning this unit, you will be able to

- describe the instructional, learning and assessment objectives
- understand the form of assessment like oral test and written test, Open Book Examination etc.,
- elaborate the construction and selection of question items through item analysis
- Perceive the reporting the students performance through different records
- Realize the benefit of feedback for reporting to different stakeholders like students, parents and administrators

## **5.3 INSTRUCTIONAL OBJECTIVES (IO)**

Instructional objective is the practice of creating instructional experiences which make the acquisition of knowledge and skill more efficient, effective and appealing. The process consists broadly of determining the state and needs of the learner, defining the end goal of instruction and creating some "intervention" to assist in the transition.

The process of IO is informed by pedagogically (process of teaching) and andragogically (adult learning) tested theories of learning and may take place in student-only, teacher-led or community-based settings. The outcome of this instruction may be directly observable and scientifically measured or completely hidden and assumed. There are many instructional design models but many are based on the ADDIE model with the five phases: analysis, design, development, implementation and evaluation. As a field, instructional design is

historically and traditionally rooted in cognitive and behavioral psychology, though recently constructivism (learning theory) has influenced thinking in the field.

### ➤ **Taxonomy of the Instructional Objective**

Robert Gagne classified the types of learning outcomes by asking how learning might be demonstrated. His domains and outcomes of learning correspond to standard verbs.

- **Cognitive Domain**

Verbal information - is stated: state, recite, tell, declare

Intellectual skills - label or classify the concepts

Intellectual skills - apply the rules and principles

Intellectual skills - problem solve by generating solutions or procedures

Discrimination: discriminate, distinguish, and differentiate

Concrete Concept: identify, name, specify, label

Defined Concept: classify, categorize, type, sort (by definition)

Rule: demonstrate, show, solve (using one rule)

Higher order rule: generate, develop, solve (using two or more rules)

Cognitive strategies - are used for learning: adopt, create, originate

- **Affective Domain**

Attitudes - are demonstrated by preferring options: choose, prefer, elect, favor

- **Psychomotor Domain**

Motor skills - enable physical performance: execute, perform, carry out

## **5.4 LEARNING OBJECTIVES**

Learning objectives are statements that define the expected goal of a curriculum, course, lesson or activity in terms of demonstrable skills or knowledge that will be acquired by a student as a result of instruction also known as: Instructional objectives, learning outcomes, learning goals. The definition of learning objectives is (or should be) the foundation of any instructional design. They are integral determining factor of strategies and Instructional design model and methods, pedagogical scenarios and lesson plans.

### ➤ Problems Defining Learning Objectives

Learning objectives when attained should be observable behaviours or actions. Words used to define learning objectives are often teacher centered and ambiguous. E.g. Students will know the seven original member countries of the European Union and their capitals. Formulations such as "Student will understand, comprehend, know" are problematic in that one cannot observe knowing or comprehension. Learning objectives should be formulated in a way that specifies how learning will be observed or measured and are thus intertwined with evaluation methods. Words that describe what the student will do to show that he or she understands are more useful. E.g. Students will be able to list 5 countries in Europe and their capitals.

### ➤ Verbs for Defining Learning Objectives

Verbs presented in the following table are lists of verbs that correspond to the cognitive domains within Bloom's Taxonomy from Cyber Campus's Tips for writing performance-based objectives.

<b>Observable verbs for the cognitive domain*</b>					
<b>Level 1. Knowledge</b>		<b>Level 2. Comprehension</b>		<b>Level 3. Application</b>	
<i>Recall of information</i>		<i>Interpret information in one's own words</i>		<i>Use knowledge or generalization in a new situation</i>	
arrange	name	classify	recognize	apply	operate
define	order	describe	report	choose	prepare
duplicate	recognize	discuss	restate	demonstrate	practice
label	relate	explain	review	dramatize	schedule
list	recall	express	select	employ	sketch
match	repeat	identify	sort	illustrate	solve
memorize	reproduce	indicate	tell	interpret	use
		locate	translate		
<b>Level 4. Analysis</b>		<b>Level 5. Synthesis</b>		<b>Level 6. Evaluation</b>	
<i>Break down knowledge into parts and show relationships among parts</i>		<i>Bring together parts of knowledge to form a whole and build relationships for new situations</i>		<i>Make judgments on basis of given criteria</i>	
analyze	differentiate	arrange	manage	appraise	evaluate
appraise	discriminate	assemble	organize	argue	judge
calculate	distinguish	collect	plan	assess	predict
categorize	examine	compose	prepare	attack	rate
compare	experiment	construct	propose	choose	score
contrast	inventory	create	set up	compare	select
criticize	question	design	synthesize	defend	support
diagram	test	formulate	write	estimate	value



## **5.5 ASSESSMENT OBJECTIVES (AO)**

Educational Assessment is the process of documenting, usually in measurable terms, knowledge, skill, attitudes and beliefs. Assessment can focus on the individual learner, the learning community (class, workshop or other organized group of learners), the institution, or the educational system as a whole (also known as granularity). The word 'assessment' came into use in an educational context after the Second World War. The final purpose of assessment practices in education depends on the theoretical framework of the practitioners and researchers, their assumptions and beliefs about the nature of human mind, the origin of knowledge and the process of learning.

### **5.5.1 Oral Test**

The oral exam (also oral test or viva voce) is a practice in many schools and disciplines in which an examiner poses questions to the student in spoken form. The student has to answer the question in such a way as to demonstrate sufficient knowledge of the subject to pass the exam. The oral exam also helps to reduce (although it does not eliminate) the risk of granting a degree to a candidate who has had the thesis or dissertation ghostwritten by an expert.

Many science programs require students pursuing a bachelor's degree to finish the program by taking an oral exam or a combination of oral and written exams to show how well a student has understood the material studied in the program. Usually, study guides or a syllabus are made available so that the students may prepare for the exam by reviewing practice questions and topics likely to be on the exam. Sometimes, the oral exam is offered in schools as an alternative to a written exam for students with a learning disability, like dysgraphia, developmental coordination disorder or non-verbal learning disorder. Often parents of the students have to request that the oral exam be given to their child in lieu of the written exam.

### **5.5.2 Written Test (Objective and Subjective)**

Assessment (either summative or formative) is often categorized as either objective or subjective. Objective assessment is a form of questioning which has a single correct answer. Subjective assessment is a form of questioning which may have more than one correct answer (or more than one way of expressing the correct answer). There are various types of objective

and subjective questions. Objective question types include true/false answers, multiple choice, multiple-response and matching questions. Subjective questions include extended-response questions and essays. Objective assessment is well suited to the increasingly popular computerized or online assessment format.

### ➤ **Informal and Formal**

Assessment can be either formal or informal. Formal assessment usually implies a written document, such as a test, quiz or paper. A formal assessment is given a numerical score or grade based on student performance, whereas an informal assessment does not contribute to a student's final grade. An informal assessment usually occurs in a more casual manner and may include observation, inventories, checklists, rating scales, rubrics, performance and portfolio assessments, participation, peer and self-evaluation and discussion.

### ➤ **Open Book and Take Home Exams**

Open book exams allow you to take notes, texts or resource materials into an exam situation. They test your ability to find and apply information and knowledge, so are often used in subjects requiring direct reference to written materials, like law statutes, statistics or acts of parliament.

Open book exams usually come in two forms:

- Traditional sit-down / limited-time exams, with varying degrees of access to resources and references.
- Take home exams—open book exams you do at home. Question(s) are handed out, answers are attempted without help from others, and the exam is returned within a specified period of time (often the next day).

### ➤ **Material Used in Open Book Exams**

The materials you can take into an Open Book exam can vary. Some restrict the type of materials (e.g. formula sheets and tables or a limited number of texts), others may be totally unrestricted (any quantity of any material).

Materials might be:

- your notes
- readings, reference materials or textbooks
- Equipment like calculators, drafting tools etc.

Materials used in Take Home exams are usually unrestricted. Check your course guide or with your lecturer to find out what you can use. The main restriction for Take Home exams is that they must be your work—you must attempt them by yourself without any help from others.

## **5.6 ACHIEVEMENT TEST**

Any test designed to assess the achievement in any subject with regard to a set of predetermined objectives.

### **5.6.1 Major steps involved in the construction of achievement test**

- Planning of test
- Preparation of a design for the test
- Preparation of the blue print
- Writing of items
- Preparation of the scoring key and marking scheme
- Preparation of question-wise analysis

#### ***i. Planning of test***

- Objective of the Test
- Determine the maximum time and maximum marks

#### ***ii. Preparation of a design for the test***

- Important factors to be considered in design for the test are:
- Weightage to objectives
- Weightage to content
- Weightage to form of questions
- Weightage to difficulty level.

### iii. Weightage to objectives

This indicates what objectives are to be tested and what weightage has to be given to each objective.

Sl. No	Objectives	Marks	Percentage
1	Knowledge	3	12
2	Understanding	2	8
3	Application	6	24
4	Analysis	8	32
5	Synthesis	4	16
6	Evaluation	2	8
<b>Total</b>		<b>25</b>	<b>100</b>

### iv. Weightage to content

This indicates the various aspects of the content to be tested and the weightage to be given to these different aspects.

Sl. No	Content	Marks	Percentage
1	Sub topic - 1	15	60
2	Sub topic - 2	10	40
<b>Total</b>		<b>25</b>	<b>100</b>

### v. Weightage to form of questions

This indicates the form of the questions to be included in the test and the weightage to be given for each form of questions.

Sl. No	Form of questions	No. of Questions	Marks	Percentage
1	Objective type	14	7	28
2	Short answer type	7	14	56
3	Essay type	1	4	16
<b>Total</b>		<b>22</b>	<b>25</b>	<b>100</b>

#### vi. Weightage to difficulty level

This indicates the total mark and weightage to be given to different level of questions.

Sl. No	Form of questions	Marks	Percentage
1	Easy	5	20
2	Average	15	60
3	Difficult	5	20
Total		25	100

#### vii. Preparation of the blue print

Blue print is a three-dimensional chart giving the placement of the objectives, content and form of questions.

Objectives Form of Qtn Content	Knowledge			Under- standing			Application			Analysis			Synthesis			Evaluation			Grant Total
	O	SA	E	O	SA	E	O	SE	E	O	SA	E	O	SA	E	O	SA	E	
Sub Topic- 1	2 (4)			1 (2)			2 (4)	2 (1)				4 (1)		2 (1)			2 (1)		15
Sub Topic – 2	1 (2)			1 (2)				2 (1)				4 (2)		2 (1)					10
Total Marks	3	0	0	2	0	0	2	4	0	0	4	4	0	4	0	0	2	0	25
Grand Total	3			2			6			8			4			2			

Note: O – Objective Type, SA – Short Answer Type, E – Essay Type

The number outside the bracket indicates the marks and those inside indicates the number of questions.

### viii. Writing of items

- The paper setter writes items according to the blue print.
- The difficulty level has to be considered while writing the items.
- It should also check whether all the questions included can be answered within the time allotted.
- It is advisable to arrange the questions in the order of their difficulty level.
- In the case of short answer and essay type questions, the marking scheme is prepared.
- In preparing marking scheme the examiner has to list out the value points to be credited and fix up the mark to be given to each value point.

### Marking Scheme

Q. No	Value points	Marks	Total Marks
1	Value Point – 1	$\frac{1}{2}$	<b>2</b>
	Value point – 2	$\frac{1}{2}$	
	Value point – 3	$\frac{1}{2}$	
	Value point – 4	$\frac{1}{2}$	
2	Value Point – 1	$\frac{1}{2}$	<b>2</b>
	Value point – 2	$\frac{1}{2}$	
	Value point – 3	$\frac{1}{2}$	
	Value point – 4	$\frac{1}{2}$	

## ix. Preparation of Question-wise Analysis

### Question-wise Analysis

Q. No	Content	Objectives	Form of Questions	Difficulty Level	Marks	Estimated Time ( In Mts.)
1	Sub topic – 1	Knowledge	Objective Type	Easy	½	1
2	Sub Topic – 2	Understanding	Objective Type	Average	½	1
3	Sub Topic – 2	Application	Objective Type	Easy	½	1
4	Sub Topic – 1	Knowledge	Objective Type	Easy	½	1
5	Sub Topic – 2	Understanding	Objective type	Average	½	1
5	Sub Topic – 1	Analysis	Short answer	Average	2	3
6	Sub Topic – 1	Synthesis	Short Answer	Difficult	2	3
7	Sub topic – 2	Application	Short answer	Easy	2	3
8	Subtopic – 1	Analysis	Essay	Average	4	10

## 5.7 TYPE OF TEST ITEMS

- Objective type
- Short answer type
- Essay Type

### 5.7.1 Objective Type

An objective type of test item is one which the response will be objective. Objective type test item broadly classified into two:

- i. Supply type (Recall Type)

The respondent has to supply the responses.

- ii. Selection type (Recognition Type)

The respondent has to select the responses from among the given responses.

**a. Objective Type – 4 Types**

- True – False Items (Alternate Response Type)
- Multiple Choice Items
- Matching Type Items
- Completion Type Test Items

**b. Advantages of Objective Type Items**

- A large amount of study material can be tested in a very short period time
- Economy of time.
- Objectivity of scoring.
- No bluffing
- It reduces the subjective element of the examiner to the minimum.
- If carefully planned, it can measure the higher mental process of understanding, application, analysis, prediction and interpretation.

**c. Limitations of Objective type items**

- Difficulty in preparing good items.
- Problem of guessing.
- Problem of cheating.
- Inefficiency in testing complicated skills
- High printing cost.
- Emphasis on testing superficial knowledge.

**5.7.2 Short answer type**

- A question requiring three value points at most may be defined as a short answer question.
- Value points diminish the subjectivity.



- Help in ensuring wide coverage of content.

#### **i. Advantages of Short answer Type Items**

- Large portion of the content can be covered in a test.
- No opportunity for guessing.
- Easy to construct, because it measures a relatively simple outcomes.
- It can be made quite objective by carefully fixing the value points.
- Useful in evaluating the ability to interpret diagrams, charts, graphs, etc.
- If carefully prepared, deep level objectives understanding, application and problem solving skill can be evaluated.

#### **ii. Limitations of Short answer Type Items**

- It is more subjective than the objective type of items.
- It may encourage student to memorize facts and develop poor study habits.
- Mechanical scoring is not possible

### **5.7.3 Essay type**

- It is free response test item.
- Help in ensuring a wide coverage of content and variety of objectives.
- Help in evaluating complex skills.

#### **i. Advantages Essay Type Items**

- Easy to prepare.
- Useful in measuring certain abilities and skills.
- Permit the examinee to write down comprehensively what he knows about something.
- Promote originality and creative thinking.
- Possibility of guess work can be eliminated.
- Reduce chance on the spot copying.
- Low printing cost.

## ii. Limitations of Essay Type Items

- Minimum validity.
- Lack of reliability.
- No objectivity.
- Rote memory is encouraged.
- It is a time consuming test item.

### **Check your Progress-1**

34. What are Open Book Exams?

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35. List out the major steps involved in the construction of Achievement test.

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36. State the limitations of Essay Type Items.

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## **5.8 ADMINISTRATION AND REPORTING OF ASSESSMENT**

### **5.8.1 Administration**

Education systems are complex, operate in diverse environments and within a context of change. One key area of change is the demand for greater accountability, which itself demands more highly specialized knowledge and skills. Other challenges arise from processes of internationalization and the increasing prevalence of markets. These developments raise questions about the nature of administration, management and leadership in educational settings. Accordingly, there is a growing need for quality research to understand this complexity and the relationships between organizational learning, organizational culture and organizational change. Critical program and policy evaluation are essential research tools informing effective growth and evolution in educational systems.

### **5.8.2 Types of Administration**

1. Autocratic or Authoritative Administration and
2. Democratic Administration.

#### **a. Autocratic Administration**

Autocratic administration involves one man's administration over others. There is one man's bossism and all others have to carry out his orders irrespective of the fact whether they like it or not. Such an administration will suit only in that type of society where there is dictatorship in the country. In such a society everybody favours autocratic pattern of living and thinking.

#### **b. Democratic Administration:**

Democratic Administration is the one which is united type of administration. In such an administration no one acts as a boss to pass orders and to rule over others.

#### **An administration**

An educationist has remarked, "It would be admitted by every administrator that the purpose of an administrative system is to help bring about a methodical and well graded achievement of the educational and social ideals of the people. In a society where the dominant ideals are democratic, the administration of education will be essentially democratic whereas in a society favoring autocratic pattern of living and thinking, the administrative organization of education is necessarily autocratic".

In India we have accepted democracy as our political, social and economic creed. Right development and progress of the country necessitates democratic outlook and ideals. That permits democratic administration only. It is obvious, therefore, that only democratic type of administration will be the most suitable to the people of this country.

### **➤ Principles of Democratic Administration**

The following are the different principles of Democratic Administration:

#### **1. Principle of Sharing Responsibility**

John Dewey, the famous American Philosopher, has defined democracy as sharing of experiences; democratic head shares his responsibility with others. His belief is in the decentralization of powers. It enables the leader and the followers to have good mental health. The democratic head does not consider himself to be a boss over others. He delegates his powers

to his colleagues and student representatives. He introduces student Govt. in the school which works under the guidance of some expert teacher. Thus, he is able to reduce his burden of work considerably.

**Chitra Naik** says, “A democratic headmaster is more than official, punctilious about his administrative mutiny, he is a leader, guiding and directing a sacred undertaking. “Sharing of responsibility is nothing but sharing of worries of organization and administration. Besides, the staff and the students are able to identify themselves with the school that way they work more and are always in the welfare of the school.

## **2. Principle of Equality**

Democracy demands equality of opportunity to all. All are equal in the eyes of law. A democratic head does not consider himself aloof from others. He feels as if he is one social being in an inseparable unity of the same social structure. So he looks upon each one of his colleagues as equal to him. In the running of the school, in decision making, he always takes his colleagues into confidence. In democracy, there are no subordinates. The democratic head considers his colleagues as his co-workers and not his subordinates.

According to **R.R. Kumaria**, “A democratic administrator should look upon his personnel as socially equal to himself; he should not take decision by himself but with his colleagues; he should make them feel responsible and share in his administration. He should have a code of set rules of administration which he and his colleagues should follow rigidly, making no discrimination in their application and lastly, he should want no special privilege”.

## **3. Principle of Freedom**

“Principle of Freedom” is one of the unique principles of democracy. The democratic head gives full freedom to his staff so that they may work according to their free will. There are no external impositions upon the staff. A teacher is free to teach the class by using any method he likes. Thus a research minded teacher is encouraged so that he is able to improve his methodology, his own self etc. The head provides full freedom to the teachers to ask questions, to criticize, reason out anything and present a different viewpoint, Not only the teacher but also

the students are provided freedom to a considerable extent. The underlying idea of this principle is that people are at their best when they have freedom to exercise their powers and talents.

#### **4. Principle of Co-Operation**

The running of a school is not one man's job. It needs combination of many hands and heads. Every member of the school should cooperate fully with the colleagues, with the head of the institution. Teaching staff and students should also co-operate fully with each other. Co-operation of other staff is also essential. Then only there will be proper functioning of the school. In fact, the democratic set-up of school life requires co-operative interaction of the members of the school life.

In the words of **Ryburn**, "The pupils of the school, if they are to develop the characteristics of co-operativeness must live when in school in a society which, in a practical way provides a living example of cooperation". 'Principle of Co-operation' is the basis of democratic administration. Full understanding and good will should prevail between headmaster and teachers, between staff and students, between parents and school, between school and the controlling authorities. Dewey emphasizes, "A society which makes provisions for participation in the food of all its members on equal terms and which secures flexible readjustment of its institutions through interaction of the different forms of associated life is so far democratic".

#### **5. Principle of Justice**

Democratic administration demands full justice on the Head of the Institution. The democratic head always shows full justice to all. He is against any type of favouritism. In case of some type of injustice, he will lose all co-operations from his followers. The democratic administration will be successful only if the head plays a fair game and does justice to one and all. Injustice gives rise to frustration. The head without the principle of justice finds the institution full of problems and his administration makes everything miserable.

#### **6. Principle of Recognition of Individual Worth**

In democratic administration, the Head shows equality to all. He comes closer to his followers and tries to understand every one. Capability, quality or merit of each individual is well recognized by him. He shows due respect to one and all irrespective of the fact that the

person is on teaching staff in allocate duties to the entire satisfaction of all concerned. Ryburn's remarks in this context are worth quoting: "Nothing will more encourage a man or a woman, a boy or a girl to a greater effort, than an encouraging recognition of good work done, of sincere effort made, of good qualities shown".

## **7. Principle of Leadership**

Democratic is the ministerial staff or a student. Only after knowing fully about the individuals he is able to type of administration needs leadership at different levels. The Head should lead the staff, the students and the community as well. This is possible only if the Head possesses all qualities of democratic leadership. **Briggs and Justman** say, "The concept of democratic leadership assumes the ability to take the initiative in crystallizing group thinking and in translating group decisions into action". So the above explained are the characteristic marks of democratic administration. The administration will be said to be democratic only if it is based on the aforesaid principles.

## **5.9 ITEM ANALYSIS**

Item analysis is a process which examines student responses to individual test items (questions) in order to assess the quality of those items and of the test as a whole. Item analysis is the process of examining the student's responses to each test item to judge the quality of the item. Specifically, what one looks for is the difficulty and discriminating power of the item as well as the effectiveness of each alternative. How hard the items for the group tested, and how well does it distinguish between the more knowledgeable and the less knowledgeable students? These characteristic can be nearly independent of each other, except that a very easy to very hard item cannot discriminate well. If all students mark the item correctly, it has not distinguished between those who know more and those who know less about the concept. If all students mark an item incorrectly, then the item is not discriminating for the group. This information may be important to the teacher for quality-control or diagnostic purpose, but it does not help identify individual differences. Note that an item analysis is no substitute for meticulous care in planning, constructing, criticizing and editing items. Several different item-analysis procedures have been proposed. Some of the more elaborate are appropriate for research projects. The procedures proposed in the section are simple, but adequate for most classroom purposes.

### ➤ Steps in Item Analysis

In conducting an item analysis of a test consists of objective type question one should follow the steps listed (suggested by Ebel, 1972). It requires the six steps outlined in the following.

1. Arrange the scored tests of answer sheets in the order of score, from high to low.
2. Separate two sub groups of test sheets, an upper group, consisting of approximately 27% of the total group, who received highest score on the test, and lower group consisting of an equal number of papers from those who received lowest scores.
3. Count the number of times each possible response to each item was chosen on the papers of the uppers group. Do the same separately for the papers of the lower group.
4. Record these responses on the copy of a test.
5. Add the counts form upper and lower groups to the keyed correct response, and divide the difference with maximum possible sum. Express the quotient as a percentage, i.e. multiply the decimal fraction by 100. The result is an index of item difficulty.

## 5.10 ITEM RESPONSE ANALYSIS

Item response analysis (IRA) is a psychometric paradigm used to design, develop, assemble, deliver, score and analyze assessments. It offers many advantages over its predecessor, classical test theory, by implementing more sophisticated mathematical modeling. Most large-scale assessments that you can think of, from professional certifications up to worldwide assessments like PISA, utilize IRT. The basic building block of IRA is the item response function, which describes the probability of a given response as a function of a person's true standing on a latent trait or ability.

### ➤ Advantages of item response analysis

- More powerful test assembly with TIF and CSEM, including parallel form construction
- Better description of item performance (difficulty, discrimination, and guessing) and model fit
- More precise scoring
- Examinees and items are placed on the same scale

- Greatly improves linking an equating of scores across forms or years
- Classical test theory tries to force a linear model on something that is known to be nonlinear
- Examinee scores are independent of test difficulty and the set of items used
- Item parameters are independent of examinee sample
- Enables computerized adaptive testing (CAT) to dramatically reduce test length and improve score precision
- Provides an estimate of each examinee's score precision, based on their responses
- Classical test theory typically forces the same estimate of reliability and SEM on all examinees even though this is known to not be the case
- IRA can produce tests that are more fair and accurate

## **5.11 ASCERTAINING STUDENT NEEDS**

In order to gauge how much students have learned, it is not enough to assess their knowledge and skills at the end of the course or program. We also need to find out what they know coming in so that we can identify more specifically the knowledge and skills they have gained during the course or program. We can choose from a variety of methods to assess your students' prior knowledge and skills. Some methods (e.g., portfolios, pre-tests, auditions) are direct measures of students' capabilities entering a course or program. Other methods (e.g., students' self-reports, inventories of prior courses or experiences) are indirect measures. Here are links to a few methods that instructors can employ to gauge students' prior knowledge.

## **5.12 IDENTIFYING STUDENT INTEREST**

Educational assessment has at least two main functions: it is part of a system of accreditation and it fosters student learning. These functions are generally described as 'summative' and 'formative' respectively. It is a useful theoretical distinction, although in practice the two purposes tend to be intertwined. Too often, the former function dominates discussion at the expense of the latter. Yet formative assessment is crucial to effective learning. In its broadest sense, it refers to the whole process of learners testing their understandings with and against others, especially the experts - their teachers. On the basis of feedback, learners modify and



develop those understandings. This feedback can be given in different forms: in responses to students' contributions in class, as well as written or oral commentary on their work.

Some of these views will also form the basis for a summative judgment and the generation of marks and grades. A good deal of it will not. If assessment is conceptualized in this way, it is not an irksome 'add on' to teaching and learning, but is understood to be an integral part of the process. The 3,000 word essay, the lab report, the multiple-choice or short essay exam, have been standard in different fields. A long tradition suggests that such forms have been quite valid for the assessment of certain outcomes but, as increasing emphasis has fallen on the development of skills (generic as well as subject-specific), some gaps have become obvious.

To take the most obvious examples, as oral communication and teamwork skills are increasingly defined as important outcomes in many courses, these skills have to be assessed by new means. Teachers have started to question how often a student needs to show that he/she can write a 3,000 word analytical essay, for instance. Innovative and creative approaches to assessment are increasingly in evidence - often the result of probing thought about what a course is really trying to achieve. As long as they are clearly explained, such tasks can enhance student interest and motivation - and are usually a lot more interesting and rewarded for academics to assess.

Two dimensions, one intellectual, the other practical. Confusion in either can make students very anxious and lead to unproductive work. The second is the easiest to address. Students have the right to a clear statement of the assessment schedule in any subject, preferably in the first class, with topics, dates, weightings, submission procedures, penalties for late submission, etc. They should also have a strong, specific statement about the nature of plagiarism and its consequences (this can perhaps be dealt with at the course level, early in first year). Any variation of these requirements during a program could have legal implications and should be approached very carefully (and probably with the advice of a head of department).

The second dimension requires a delicate balance, which is perhaps part of the 'art' of teaching. Understandably, students want to know exactly what they have to do to gain good marks or grades. Teachers can do a lot to assist them with this - and a great deal more than has usually been done in the past. They can set out criteria by which each task will be judged (see below), they can discuss the task in class before submission (and afterwards, with a view to the

next task), they can provide sample answers, offer examples of good writing in the discipline, and so on. What they cannot do is reduce success to a formula that is easy to follow. To do so would be to discourage some of the higher order skills that university study attempts to develop. These skills require some room for individuality, originality, creativity and the unexpected. A graduated approach may be part of the answer, with strong direction provided in the early years and increasing encouragement of individual approaches as student's progress.

### **5.13 FEED FORWARD FOR IMPROVING LEARNING**

Feed forward is types of learning that proceeds from the initial there learning processes toward fourth, institutionalization like ripples in a pond insight travel outward to larger groups as learning as extended institutionalized. New knowledge and practices feed forward from the individual or groups' level to the organizational level feed forward can involve changes in thinking and behaviors. As such feed forward taps the exploration of new learning. Feed forward" is more about assessment for learning (Ramsden, 1995).

The concept of feed forward (which can literally be interpreted as providing feedback in advance) comes from cybernetics and is understood as a process able to improve control over the system. While feedback promotes the resolution of errors when a deviation over the initial status is recorded, feed forward uses knowledge of the system to act on or remedy failures Brosilow and Joseph (2002) cited by Basso and Olivetti Belardinelli (2006), thus enabling changes to be anticipated. Consequently, feed forward works by perfecting generated through successive comparisons between the actual and the final product expected. In its educational applications and covering cognitive psychology contributions, feed forward is a process modeled by the student in relationship to the proposals and objectives in the environment. The focus promoted by feed forward for informing and making decisions about the results of the assessment, highlighting the prospective nature, seeking and fostering the elements in students that enable them to advance in order to acquire the declared competencies.

It also enables difficulties to be anticipated in the situation to be resolved (the assessment task) and their transfer. This enables the student to be instructed in the aspects of the system (situation/problem) that need to be detected in order to successfully resolve the demand. In this sense, it is more strategic than feedback, which enables it to foster continual learning. This focus

requires the student's participation in and commitment to the task and a more authentic type of assessment to be developed. More specifically, feed forward requires the assessment maps to be harmonized between the professor and the student. In other words, it is adapted to the assessment demands and learning requirements. It has a more democratic and committed nature because it opens shared dialogue, based on ethical dialogue, where the participants create the roadmap towards acquiring the competencies (García-Sanpedro, 2010).

#### **Check your Progress-2**

4. Give the meaning of Democratic Administration.

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5. Define Item Analysis.

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6. How will you assess student needs?

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### **5.14 REPORTING STUDENT PERFORMANCE**

Requirements for formal and informal reporting are based on ministerial orders and regulations authorized under the School Act. Schools must follow the specific requirements for reporting student progress as outlined in the policy.

#### **5.14.1 Formal Reports**

Formal reports communicate to parents and students significant aspects of the students' progress in the areas of intellectual, social, human and career development.

## **Performance Scale**

The performance scale for Primary students indicates, in words or as a graph, the student's level of performance in relation to the expected learning outcomes set out in the provincial curriculum for each subject and grade.

For Kindergarten, performance is described as one of the following:

- Approaching Expectations
- Meeting Expectations
- Exceeding Expectations
- For Grades 1 to 3, performance is described as one of the following: Not Yet Meeting Expectations

Use of the performance scale to show progress in language arts (including reading, writing, and speaking/listening), mathematics, social studies and science is mandatory. The performance scale may also be used to report progress in other areas, such as fine arts, personal planning, physical education, social responsibility and work habits.

### **5.14.2 Informal Reports**

Each school year, teachers must provide parents with a minimum of two informal reports. In relation to curriculum, informal reports may describe:

- what the student is able to do
- The areas of learning that require further attention or development
- Ways the teacher is supporting the student's learning needs

(and where appropriate, ways the student or the parents might support the learning)

Informal reports are an important link between home and school and can take a variety of forms, such as:

- telephone calls
- interim reports (written or oral)
- Conferences (parent-teacher, three-way, student-led, etc.)

Parents should have the opportunity to meet with teachers for a conference at least once each school year. A record of each informal report should be kept, noting the date and type and topic(s) of discussion.

### **5.14.3 Progress Report**

A critical element of any student's learning experience is the need for informed and meaningful feedback to those invested in the student's progress. Reporting on student progress must have a well-defined purpose for it to be meaningful. It must clearly identify the information needing to be communicated, the audience it is intended for and how that information will be used to improve future or related learning.

Three primary purposes for reporting student progress:

1. To communicate student growth to parents and the broader community.
2. To provide feedback to students for self-evaluation.
3. To document student progress and the effectiveness of instructional programs.

Because reporting student progress serves a variety of purposes, we believe no one method of reporting is capable of serving all purposes well. A multi-faceted comprehensive reporting system is essential. Multiple means of reporting progress is divided into two subsets, individual and whole school reports. Within these subsets, the means for reporting may include but are not limited to:

Individual Subset - report cards, progress reports, standardized testing, evaluated projects and assignments, portfolios and exhibitions of student work, homework, individual web pages, parent-teacher conferences, student-teacher conferences and student led conferences.

Whole School Subset- Standardized testing, open houses, classroom and school-wide news letters, Each means of reporting on student progress will include a statement of purpose. The statement of purpose may vary according to the specific type of reporting taking place and the audience it is directed toward.

#### **5.14.4 Cumulative Record**

This is longitudinal record of pupils' educational history. The progress of the development pattern of each student is recorded cumulatively from period to period in a comprehensive record designed for the purpose. Such a record is known as a cumulative record.

##### **a. Elements of a Cumulative Record**

- Data on achievement in various subjects of study
- Physical development
- Health matters
- Participation in co-curricular activities
- Special achievements
- Personal details

#### **5.14.5 Profile**

An outline of something, especially a person's face, as seen from one side. A short article giving a description of a person or organization. Describe (a person or organization) in a short article. Represent in outline from one side.

#### **5.14.6 Open House**

An open house (also known as open day and at-home day) is an event held at an institution where its doors are open to the general public to allow people to have a look around it in order to gain information on it. These are often held at schools and universities in most areas to attract prospective students, familiarize them (and their parents) with facilities, allow new students to become familiar with facilities and meet others, or to open informal communication channels between school staff and students and parents.

Open houses are often seen as one of the last times a graduating senior will see their friends in such a large gathering and is often celebrated with much enthusiasm. Friends and family of the graduate are often in attendance to celebrate their graduate's accomplishment as well as wishing them a bright future. Open houses are also usually an opportunity for the graduate to receive some money for their further education. Guests traditionally bring small gifts or cards with money, as a way of supporting the graduate's college tuition.

## 5.15 USING THE FEEDBACK FOR REPORTING TO DIFFERENT SHAREHOLDER

A stakeholder is anyone who is involved in the welfare and success of a school and its students, including administrators, teachers, staff, students, parents, community members, school board members, city councilors and state representatives. Stakeholders may also be collective entities, such as organizations, initiatives, committees, media outlets and cultural institutions. They have a stake in the school and its students, which means they have personal, professional, civic, financial interest or concern in the school. Stakeholder engagement is considered vital to the success and improvement of a school. The involvement of the broader community of the school with it can improve communication and public understanding and allows for the incorporation of the perspectives, experiences and expertise of participating community members to improve reform proposals, strategies, or processes.

Parent, family and community involvement can have a different meaning for different people. A research-based framework developed by Joyce Epstein of John Hopkins University, describes six types of involvement:

- **Parenting:** Help families by providing them with parenting skills and family support; make them understand the phases of child development, its complexities and ways to cope with it. Help schools understand backgrounds and cultures of families and their goals for children.
- **Communicating:** Create reliable communication channels between school and home to communicate with families about school programs and student progress.
- **Volunteering:** Enable educators to work with volunteers who support students and the school. Involve families as volunteers and as audiences at the school.
- **Learning at Home:** Encourage the involvement of families in their children's academic learning at home through curriculum-related activities such as including homework and goal setting.
- **Decision Making:** Make families participants in school decisions, governance and advocacy activities.

- **Collaborating with the Community:** Co-ordinate resources and services for families, students and the school with community groups such as businesses, cultural and civic organizations, colleges or universities.

### 5.15.1 Students

Feedback is any response made in relation to students' work or performance. It can be given by a teacher, an external assessor or a student peer. It is usually spoken or written. Feedback is ... most effective when it is timely, perceived as relevant, meaningful and encouraging, and offers suggestions for improvement that are within a student's grasp (Brown, Bull, & Pendlebury, 1997). It is intended to acknowledge the progress students have made towards achieving the learning outcomes of a unit. Good feedback is also constructive, and identifies ways in which students can improve their learning and achievement. Providing a mark or a grade only, even with a brief comment like "good work" or "you need to improve" is rarely helpful.

Here are some common examples of feedback that is not helpful to students (Chamberlain, Dison & Button, 1998). It is widely recognized that feedback is an important part of the learning cycle, but both students and teachers frequently express disappointment and frustration in relation to the conduct of the feedback process. Students may complain that feedback on assessment is unhelpful or unclear, and sometimes even demoralizing. Additionally, students sometimes report that they are not given guidance as to how to use feedback to improve subsequent performance. Even worse, students sometimes note that the feedback is provided too late to be of any use or relevance at all. For their part, lecturers frequently comment that students are not interested in feedback comments and are only concerned with the mark. Furthermore, lecturers express frustration that students do not incorporate feedback advice into subsequent tasks.

### Good Feedback Principles

- Promote dialogue and conversation around the goals of the assessment task
- Emphasize the instructional aspects of feedback and not only the correctional dimensions.
- Remember to provide feed forward indicate what students need to think about in order to bring their task performance closer to the goals



- Specify the goals of the assessment task and use feedback to link student performance to the specified assessment goals
- Engage the students in practical exercises and dialogue to help them to understand the task criteria
- Engage the students in conversation around the purposes of feedback and feed forward
- Design feedback comments that invite self- evaluation and future self- learning management
- Enlarge the range of participants in the feedback conversation - incorporate self and peer feedback

### **5.15.2 Parents**

A review process of the new reporting resources was carried out with a number of schools. Schools that reviewed the materials found them useful and easy to follow. They believed that the materials signaled a desirable paradigm shift in reporting to parents. In particular, the following aspects of the materials were highly valued by schools:

- The principles were seen as clear and appropriate.
- Examples illustrating what parents can do at home were seen as useful for either school reports or school newsletters.
- National standards clarifications were welcomed, considered ‘overdue’ and seen as clear and useful for both teachers and parents.
- The information sharing process diagram was seen as ‘helpful’ and ‘well constructed’.
- The example of key competencies reporting was seen as useful.

The quotes below provide a flavour of the positive feedback from schools.

- There is a big gap between what schools are providing in the way of feedback and what parents actually want.
- Parents don’t feel they are getting the right information in a timely manner to support and coach their children
- Parents commented that the feedback they currently receive is too late to action as the moment in time has passed.

- Parents prefer reporting based on their child's progression rather than measurement against a benchmark (despite popular belief). This reflects the need for progressive reporting using a method such as the Hattie feedback and reflection model (Hattie & Timperley, 2007, pp. 86-87).

### **Parent Involvement**

- Parental involvement decreases dramatically as a child progresses through education.
- Other family support decreases dramatically as a child progresses through education.
- Schools which integrate social activities and teamwork into the curriculum (not just by making the kids play sport) have happier parents/students.
- Students who participate in task reflection with their parents on a weekly basis are more likely to be a grade average student than students that participate in task reflection on a less frequent basis.

### **5.15.3 Administrator**

To assess student progress toward the established district standards and to facilitate the planning of various types of instruction, administration should ensure that teachers are utilizing information from a variety of valid and appropriate sources before they begin planning lessons or teaching. This could include data regarding students' backgrounds, academic levels, and interests, as well as other data from student records to ascertain academic needs and to facilitate planning appropriate initial learning. It is important for the administration to note that information regarding students and their families is used by the staff for professional purposes only and is kept confidential as a matter of professional ethics.

Administrators should determine if teachers are using the numerous formative and summative diagnostic processes available to assist in planning meaningful instruction. Formative measures include ongoing teacher monitoring of student progress during the lessons, practice sessions, and on daily assignments. Measures administered periodically like criterion-referenced tests, grade level examinations or placement tests that are teacher-made or part of district-adopted material, also provide helpful information on the status of student learning as instruction progresses. Summative measures like minimum competency examinations, district mastery tests and standardized tests provide a different perspective from the ongoing formative measures. This

type of data enables the teacher to evaluate the long-term retention rate of their students and to compare student learning on a regional, state or national basis.

The administrators should verify that teachers are preparing and maintaining adequate and accurate records of student progress. This will include the regular and systematic recording of meaningful data regarding student progress on specific concepts and skills related to the standards for each subject for the grade level or course they are teaching. Once students' success levels have been identified from the records, the teacher should use the information to plan instruction and any necessary remediation and enrichment. By utilizing ongoing information on achievement, teachers can maintain consistent and challenging expectations for all students. Students and parents should be informed of the students' progress toward achieving district goals and Objectives through comments on individual work, progress reports, conferencing, report cards and other measures. Students should be encouraged to participate in self-assessment as a way of motivating students to improve academic achievement.

## **5.16 USE OF FEEDBACK FOR TEACHERS' SELF IMPROVEMENT**

Receiving student feedback in the middle of the semester can help you to know what you are doing that facilitates the learning of the students and it will help make you aware of any difficulties they may be having with your instruction. It allows you to make adjustments needed by students in your class before the end of the semester and will foster a feeling among your students that you care about your teaching. Often minor adjustments on your part can make a tremendous difference in the classroom.

### **5.16.1 Get written feedback**

Have your students fill out a questionnaire about six weeks into the semester. By this time students have a general sense of the class and your teaching. The anonymity of the questionnaire will allow students to be honest about how they feel about the course and about you as their teacher. A less formal way to get written feedback from your students is to pass out paper and have them write down what they like about the class, what they don't like about the class, and suggestions for change. This latter method can be used two or three times during the semester

and can also be used to evaluate a particular class session about which you would like evaluative information.

### **Use Midterm Student Feedback (MSF)**

A MSF involves the use of small group discussions among students about the strengths of the course and any changes that would assist their learning. The instructor arranges to have a CRLT consultant visit the class sometime early in the term. The consultant arrives at the beginning of the class and observes until there are approximately 25 minutes left. At that time, the instructor turns the class over to the consultant and leaves the room. The consultant explains the procedure and its purpose and then divides the class into groups of four or five students. Each group receives a sheet with the following questions:

- a. List the major strengths of this discussion section/lab. (What is helping you learn in this section/lab?) Please explain briefly or give an example for each strength.
- b. List changes that could be made in the section/lab to assist you in learning.

Students are asked to discuss each of these questions in their groups. The groups then share their responses with the whole class and the consultant clarifies and records responses.

### **5.16.2 Self Reflection**

Keeping a teaching journal can be a useful tool to help you reflect on your teaching and can assist you as you work to develop your own personal teaching style. Following are some ways you might use such a journal:

- As you are planning your instruction, write in your journal the goals of a class session and how you plan to reach those goals. If you articulate what you want students to be able to do after a particular class period, it will help you design more effective instruction.
- Immediately after a class session, reflect on whether you reached the goals, what worked, what didn't work as well as you would like and alternative things you might try another time. Also write down anything you learned: e.g., observations about a particular student, a

combination of students in small groups that worked well or something that you learned about yourself as a teacher.

- You might also record in your journal any ideas about teaching gained by talking to other GSIs, from classes you attend as a graduate student or by attending workshops on teaching. Relating these ideas to your own teaching can assist you in becoming an effective teacher.

### **i. Peer Observation**

Peer observation refers to a teacher or other observer closely watching and monitoring a language lesson or part of a lesson in order to gain an understanding of some aspect of teaching, learning or classroom interaction.

#### **Purpose and benefits of peer observation**

In teaching, observation provides an opportunity for novice teachers to see what more experienced teachers do when they teach a lesson and how they do it. But experienced teachers can also benefit from peer observation. It provides an opportunity for the teacher to see how someone else deals with many of the same problems teachers face on a daily basis. A teacher might discover that a colleague has effective teaching strategies that the observer has never tried. Observing another teacher may also trigger reflections about one's own teaching.

For the teacher being observed, the observer can provide an "objective" view of the lesson and can collect information about the lesson that the teacher who is teaching the lesson might not otherwise be able to gather. For both teachers, observation also has social benefits. It brings teachers together who might not normally have a chance to interact and provides an opportunity for the sharing of ideas and expertise, as well as a chance to discuss problems and concerns. Observation provides a chance to see how other teachers teach, it is a means of building collegiality in a school, it can be a way of collecting information about teaching and classroom processes, it provides an opportunity to get feedback on one's teaching, and it is a way of developing self-awareness of one's own teaching.

### **5.16.3 Curriculum design**

- Curriculum fosters breadth and depth of understanding in subject area.
- Content is aligned to national and state standards.

- Curriculum is supported by quality, reputable, recently published textbooks and/or proven instructional resources and materials.
- Content and assessments are aligned, accurate and unbiased
- Content is current, relevant and provides real- world applications
- Content is appropriate for the learner (age, ability, background, reading level, learning style, etc.)
- Instructional design is adaptable and flexible in order to best meet individual needs of Learning Coaches and students
- Instructional design provides students opportunities to improve learning skills using technological tools (e.g., virtual labs, interactive tools Teach let tutorials, business software, online calculator)
- Navigation is intuitive and age- appropriate
- Lesson structure is consistent and supports learning sequence of motivation, instructional content, application activities, review of key concepts and assessment
- Scope of course is appropriate with regard to amount of content, length of course and lessons and course requirements
- Lesson introduction effectively presents lesson objectives, assesses prior knowledge, sets expectations and motivates
- Background information prepares students to access new content, skills and strategies
- Curriculum includes opportunities for developing problem solving and critical thinking skills and real-world applications curriculum includes opportunities for collaboration and independent study
- Curriculum includes opportunities to develop oral and written communication skills
- Curriculum incorporates timely and appropriate feedback to students

**Check your Progress-3**

7. What are Formal Reports?

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8. Write a note on 'Cumulative Record'.

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9. Give the meaning of Feedback.

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**5.17 LET US SUM UP**

So far you have learnt about how planning is helpful for the teachers in framing instructional learning and assessment objectives. You have understood how the different form of assessments such oral test and written test differ from one another. You have also understood the uses of preparing blue print to know whether all type of questions asked from all portions of the syllabus. The present chapter made you to learn how item analysis can be made to select suitable items in the test. Different reporting records of student's performance such as Progress reports, Cumulative records, Profiles and Open house and its benefits are studied in this chapter. The benefits of the feedback for reporting to different stakeholders such as students, parents and administrators were learnt. Finally, how feedback helps for teachers improvement and the revision for curriculum were also learnt.

## 5.18 ANSWERS TO ‘CHECK YOUR PROGRESS’

1. Open book exams allow you to take notes, texts or resource materials into an exam situation. They test your ability to find and apply information and knowledge, so are often used in subjects requiring direct reference to written materials, like law statutes, statistics or acts of parliament.
2. Major steps involved in the construction of achievement test
  - Planning of test
  - Preparation of a design for the test
  - Preparation of the blue print
  - Writing of items
  - Preparation of the scoring key and marking scheme
  - Preparation of question-wise analysis
3. Limitations of Essay Type Items
  - Minimum validity.
  - Lack of reliability.
  - No objectivity.
  - Rote memory is encouraged.
  - It is a time consuming test item.
4. Democratic Administration is the one which is united type of administration. In such an administration no one acts as a boss to pass orders and to rule over others.
5. Item analysis is a process which examines student responses to individual test items (questions) in order to assess the quality of those items and of the test as a whole.
6. There is a variety of methods to assess your students’ prior knowledge and skills. Some methods (e.g., portfolios, pre-tests, auditions) are direct measures of students’ capabilities entering a course or program. Other methods (e.g., students’ self-reports, inventories of prior courses or experiences) are indirect measures.
7. Formal reports communicate to parents and students significant aspects of the students’ progress in the areas of intellectual, social, human and career development.
8. This is longitudinal record of pupils’ educational history. The progress of the development pattern of each student is recorded cumulatively from period to period in a comprehensive record designed for the purpose. Such a record is known as a cumulative record.



9. Feedback is any response made in relation to students' work or performance. It can be given by a teacher, an external assessor or a student peer. It is usually spoken or written.

### 5.18 UNIT END EXERCISES

- Describe the meaning of Open Book and Take Home Exams
- Bring out the Major steps involved in the construction of achievement test
- Give the different type of Test Items such as Objective Type, Short Answer Type and Essay Type
- Explain the meaning and different types of administration
- Discuss Item Analysis
- Describe Ascertaining student needs and Identifying student interest
- Explain Formal reports, performance scale, Informal Reports and Progress report
- Give the meaning of Profiles and Open house
- Enumerate Using feedback for reporting to different stakeholders - students, parents, and administrators
- bring out the use of Feedback for teachers' self-improvement and curriculum revision

### 1.8. SUGGESTED READINGS

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## **UNIT – VI**

# **ISSUES, CONCERNS AND TRENDS IN ASSESSMENT AND EVALUATION**

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## **STRUCTURE**

### **6.1 INTRODUCTION**

### **6.2 LEARNING OBJECTIVES**

### **6.3 EXISTING PRACTICES**

#### **6.3.1 Class /Unit Tests**

#### **6.3.2 Half- Yearly and Annual Examinations**

#### **6.3.3 Board Examination**

#### **6.3.4 Entrance Test**

### **6.4 STATE AND NATIONAL ACHIEVEMENT SURVEY (NAS)**

### **6.5 QUESTION BANK**

### **6.6 MARKING VS GRADING**

#### **6.6.1 Non-Detention Policy**

#### **6.6.2 Objectivity Vs Subjectivity**

### **6.7 PSYCHOLOGICAL TESTS**

#### **6.7.1 IQ/Achievement Tests**

#### **6.7.2 Attitude Tests**

#### **6.7.3 Neuropsychological Tests**

#### **6.7.4 Personality Tests**

#### **6.7.5 Objective Tests**

#### **6.7.6 Projective Tests**

#### **6.7.7 Direct Observation Tests**

#### **6.7.8 Interest Tests**

#### **6.7.9 Aptitude Tests**

### **6.8 COMPETITIVE EXAMINATION**

### **6.9 MENACE OF COACHING CENTRES**

### **6.10 TRENDS IN ASSESSMENT AND EVALUATION**

#### **6.10.1 Online Examination**

#### **6.10.2 Computer - Based Examination**

### **6.11 LET US SUM UP**

### **6.12 ANSWERS TO ‘CHECK YOUR PROGRESS’**

### **6.13 UNIT END EXERCISES**

### **6.14 SUGGESTED READINGS**

## **6.1 INTRODUCTION**

The present chapter deals with existing practices in classrooms regarding assessments and evaluation. A teacher may conduct slip test to know the level of observing the content in the class as soon as the teaching is over. Like this, the same teacher will conduct weekly test, monthly test and half-yearly examinations to understand the comprehensiveness of the learner. Annual examination will be treated as terminal examination to decide whether the learner is eligible to get to the next higher class. The nature of all the tests was described. The nature of board examinations and entrance test, state and national achievement surveys were explained in a detailed manner. How question bank can be utilized and its problems are also described and the present issues and problems were also explained in this chapter. The structure and function of marking and grading, Non - detention policy, Objectivity Vs Subjectivity; Teacher assessment versus self and peer assessment were discussed. The scope and use of psychological tests and tools and trends in assessment and evaluation such as online examination, Computer - based examination and other technology based examinations, Standards - based assessment and international practices were also discussed in the present chapter.

## **6.2. LEARNING OBJECTIVES**

After studying this unit, you will be able to

- describe the meaning Class/Unit test and half- yearly and annual examinations
- explain the nature of Board examinations and Entrance tests
- elaborate the State and National achievement surveys
- explain the concept of a Question Bank.
- highlight the advantages of marking system Vs grading system.
- discuss about Non - detention policy
- identify the limitations of grading system.
- describe different modes of objectivity Vs subjectivity.
- bring out the scope of psychological tests
- give the purpose of entrance test
- explain the nature of Online examination, Computer - based examination

## **6.3 EXISTING PRACTICES**

### **6.3.1 Class /Unit Tests**

A class test is an assessment intended to measure a test-takers knowledge, skill, aptitude, physical fitness or classification in many other topics in a class. A test may be administered verbally, on paper, on a computer, or in a confined area that requires a test taker to physically perform a set of skills. Tests vary in style, rigor and requirements. A test may be administered formally or informally. Formal testing often results in a grade or a test score. A test score may be interpreted with regards to a norm or criterion, or occasionally both. The norm may be established independently or by statistical analysis of a large number of participants.

In a syllabus of any standard or subject, there will be six to ten units. The teachers supposed to teach a unit in a month. Besides the weekly tests in a class, they will be conducting a test as soon as the whole unit is covered at the end of a month. This may be called as a unit test. The date and the nature of the question pattern may be at the wish of the teacher. This may help the teacher to know the level; of understanding of the learner.

### **6.3.2 Half- Yearly and Annual Examinations**

After the quarterly exams two more will be taught and exam will be conducted for the whole portion. This will be called half-yearly exam. When all the units are covered probably in the in the month of March or April, the terminal examination or annual examination will be conducted. This is the regular pattern of conducting examination. Now, the tri-semester has been introduced in schools where one semester consists of three months. The specialty of the system is, once the semester is over, the learner will not be tested again on the previous portion.

### **6.3.3 Board Examination**

In India, board examinations refer to the public examinations that occur at the end of the 9<sup>th</sup> to 10<sup>th</sup> grade education (SSC) or at the end of the 11<sup>th</sup> to 12<sup>th</sup> grade education (HSC). The scores achieved in these exams are considered very important for getting into university, getting into professional courses or training programmes, and even possibly in finding employment.

### **a. State Board Examinations**

State board examinations are variously referred to as Madhayamik, Secondary State Certificate and Higher Secondary Certificate examinations. They are conducted and managed by each education board of the different states in the country. They do not take place simultaneously due to the differences between syllabi and the examination itself. The examinations are generally held in the months of February and March, and the results are out in May and June.

Students have to apply for the examinations in November stating their personal details, subjects and current educational status. Admit cards for the prescribed examination hall are received at the notified cell or their respective schools about 20–25 days prior to the commencement of the exam.

Examinations are offered for various fields which include Science, Maths, Social Studies, regional and foreign languages for SSC; Physics, Chemistry, Maths, Social Studies, basic Computer Science and basic Electronic, IT, Western Classical Music and Indian Classical Music, Economics for HSC. Students follow a fixed pattern in choosing the subjects.

### **b. Central Board for Secondary Education**

Each of the examinations takes place simultaneously across the country, to ensure that questions are not leaked in advance across time zone. Security is usually high for these board examinations. The question papers are distributed by the overseeing board of education, and their contents are guarded closely until the exam begins. The examinations may include multiple sets of question papers as well. The candidates are issued identification passes in advance, which are presented to the staff at the examination site. The site itself must not be the same school where a candidate is from; to ensure impartiality, the candidate must travel to a different school to take the examination. For the same reason, the candidate may not identify himself/herself on the answer sheet except with an identity-masking number. Use of calculation aids other than logarithm tables, which are provided by the examination center, is prohibited. The examinations last about 3 hours per course.

#### **6.3.4 Entrance Test**

An entrance examination is an examination that many educational institutions use to select students for admission. These exams may be administered at any level of education, from primary to higher education, although they are more common at higher levels.

In India, entrance examinations are chiefly confined to Medicine, Engineering and Management. These range from the BITS Pilani admission test and IIT- JEE, where only one in a hundreds can hope to get admission to state level entrances which are many and varied. The stiff competition has led to a situation where many students neglect their school studies and focus solely on entrance coaching which is time-consuming and expensive. This has led many states to scrap the entrances and base admissions on the school leaving marks which unfortunately are none too reliable. Experts point out that in a country where many different boards are present common entrances are essential, but application skills rather than cramming should be stressed on. Frequent changes in the pattern of examination are essential since sticking to a 'standard text' or 'standard pattern' alone will favour the coaching industry and the role- learners.

#### **6.4 STATE AND NATIONAL ACHIEVEMENT SURVEY (NAS)**

India has made a significant investment in its education. The government's flagship programme Sarva Shiksha Abhiyan (SSA) is designed to ensure access, equity and quality in elementary education. The nation now needs reliable information about students' achievement in order to judge the quality of education provided. The history of NAS Carried out as part of SSA, the NAS aims to collect reliable information about the achievement levels of students in government and government-aided elementary schools. In 2000, NCERT's NAS programme was incorporated into the SSA programme. The plan was to carry out three NAS cycles, each cycle covering three key grades: • Class III, • Class V, • Class VII/VIII. All three Classes are tested in mathematics and language. In Class V, students are also tested in environmental studies (EVS), while Class VII/VIII completes tests in science and social science.

The Baseline Achievement Survey (BAS) was carried out in 2001-2004, followed by the Midterm Achievement Survey (MAS) in 2005-2008. The experience gained through these initial two cycles made the value of the NAS clear, and the surveys were made an ongoing feature of

the national education system. To mark this shift from stand-alone surveys to continuous assessment, the Terminal Achievement Survey (TAS) has been renamed 'Cycle 3'. Measuring progress in education the NAS is a useful tool for teachers and policymakers alike – to establish what students are achieving in core subjects and to identify any areas of concern. By repeating the NAS at regular intervals, the data can be used to measure trends in education achievement levels and measure progress made by SSA and other education reforms.

## **6.5 QUESTION BANK**

Question Bank is a collection or reservoir of questions for timely use. But haphazard collection of question will not make a Question Bank. The questions in a Question Bank must be reliable and valid and should be suitable for testing different traits and the candidates. Therefore, each question in a Question Bank is scrutinized on the basis of its quality and relevance and is included in the bank only after assigning technical values to enable the users to use them according to their requirements.

The technical specifications help the user of the bank to understand the type of question, what it test, to which level it is applicable etc. These statistical specifications further help in standardizing the questions are processed through field trial to derive certain statistical specifications such as difficulty level, discriminative index etc., these statistical specifications further help in standardizing the question banks and increasing their utility.

Technical value includes code number, subject, topic, date of writing, type of question, objective tested, level of question, time required for answering, marks allotted, difficulty level, discriminative index etc. A question bank once made is useful for future. Maintenance of a question bank is a continuous process, because with the passage of time many items/ questions become outdated and need to be removed and many news items/questions need to be added to the question bank. One of the important criteria for a question bank to be of good value and utility is the number of questions it contains. The greater the number if questions, the more valuable it will be. If the question banks are not large, choice of questions will be severely curtailed for the examining bodies and more importantly the students who use the question bank may mug up all the questions and their answers before appearing for the examinations, this will defeat the whole purpose of examination. Therefore, it is absolutely necessary that the bank have a large number of questions.

**Check your Progress-1**

37. Annual examination is otherwise named as -----examination.

- a). Terminal   b). Half-yearly   c).quarterly   d). weekly

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38. What do you mean by Board Exam?

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39. State any one of the uses of entrance examination in schools.

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**6.6 MARKING VS GRADING**

Realizing the bottlenecks in our examinations, a lot of thinking along with deliberate efforts to bring about examination reforms has been the feature of post independence Indian education. During this period many thoughtful endeavors were initiated in the areas of paper setting, making system more systematic and objective and for transforming making system into grading system. Many education commissions and committee emphasized the need for a systemic change in examination system in our country. Council of Boards of Secondary Education (COBSE) constituted a committee on scaling and grading in 1981. This committee recommended five-point grading system. National Policy of Education (1986) and Programme of Action (1992) also recommended the use of grades in place of marks while declaring the results. National Curriculum Framework for School Education published by NCERT (2005) also reiterated the need for declaring results in terms of grades in place of marks.



**a. Limitations of the present system of numerical marking**

- Placing students on this scale by assigning a number in terms of interval of one unit it's unjustified because of imperfection of the tools/test.
- The marking scheme creates a cutthroat competition among the students due to highly sensitive interval scale. This may lead to the use of unfair means / practices in securing marks.
- There is lot of scope for inter intra-examiner variation in assessing students performance. Different examiners evaluate the same students differently in same subject leading to inter-examiner variability. Sometimes the same examiner assess the performance of the student on the same test differently at different times leading to intra-examiner variability.
- Inter and intra-examiner variability in marking of scripts is so high that it decreases reliability of the scores.
- Marks awarded for the performance of a student do not represent the trued mark because of inherent errors in measurement.
- The mean of population is unknown in a random sample. True score of a student's getting 50 marks can vary as follows if the standard error of measurement is ten.
  - i. 40 and 60 in 68% of cases
  - ii. 30 and 70 in 95% of cases
  - iii. 20 and 80 in 99% of cases
- The negative effect of pass/ fail system takes a heavy toll. For example, a child who fails once in an examination is labeled as 'failed' throughout life.
- \the system of pass / fail encourages commercialization of education.
- In the pass/fail system there is colossal wastage of human resource at national level.
- Over-emphasis on marks has made the present evaluation system insensitive to humans beings; and
- In the marking scheme there is no provision for improving performance by the students if they are satisfied.

## **b. Concept of Grading System**

Evaluation is a powerful and potential process to know the direction in which the children are developing. Evaluation is considered to be one the most important components of education process that helps in assessing the performance of children in a teaching- learning context. The usual practice of assessment in schools is through conducting examinations. One of the major drawbacks of our examination system is reporting students' performance in terms of marks. In order to minimize the limitations of present day examinations system, a major reform concerns transforming the marking system into a grading system.

Grading is a process of classifying students based on their performance into groups with the help of predetermined standards, expressed in a symbolic form i.e., letters of English alphabet. As these grade and corresponding symbols are pre-determined and well defined, all the stakeholder would understand them uniformly and consistently. While developing the grading system, it is of utmost significance that the meaning of each grading symbol be clearly spelt out. Inspire of strict of strict adherence to the pre – determined stipulations, there may be inter examiner and intra – examiner variations. Pre determination is only in terms of standards of categorization and to give a common meaning to the letter symbols that signify grades. Hence strict adherence of examiners to the pre-defined meaning of the grade system would not curtail their freedom in expressing the students' performance.

Sometimes the grade awarded may be compared within and between groups. In this type of comparison not only the grades awarded by a particular teacher but also the grades awarded by different teachers would be compared. This helps in ascertaining the position of students with reference to a group. Comparing grades awarded by a single teacher (intra-group) and by, different teacher (inter-group) with reference to a larger group is considered as norm-referenced. This would help in location the position of a student in a larger group. Hence, norm-referenced measures would help in comparing the grades awarded by different teachers and institutions. Thus, the grades may be used for communicating the students' performance with reference to specified criteria and also the relative position of students with reference to their peer group.

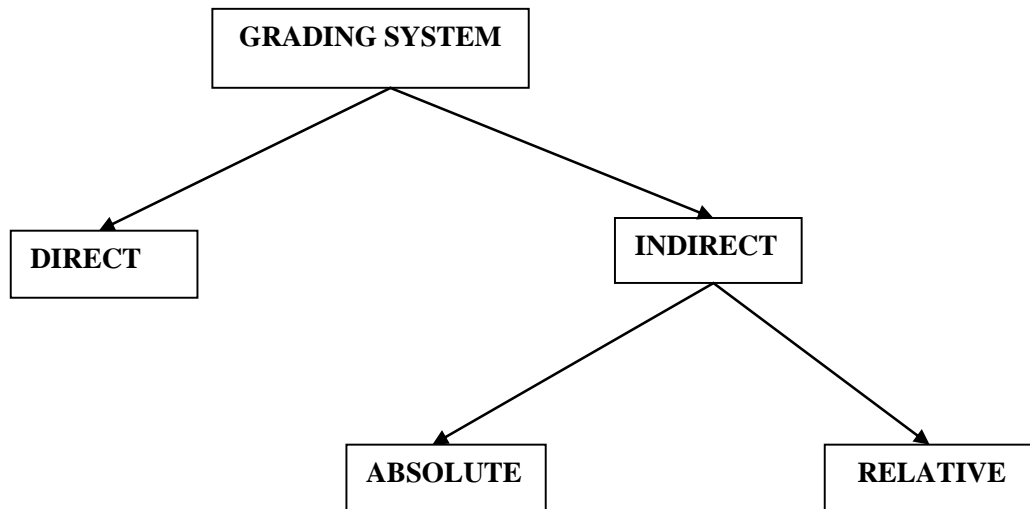
### **c. Merits of Grading System**

Due to over-emphasis on examinations, both teaching and learning have become examination- centered. Teachers teach for examinations and students learn for examinations. Award of marks and declaration of results has become the main purpose of schooling. Actually, Examinations are meant to examine the process of learning. They help teachers to locate learning variations among children. Examinations also aim at helping children estimate their learning performance and accordingly improve their proficiencies. But these idealistic purposes of examinations have taken a back seat.

Securing marks rather than improving the levels of that attainment has become the main objective of students. Teaching is a deliberate process of achieving instructional objectives and evaluation is a means of estimating the extent of their accomplishment. But due to the prevalence of marks consciousness, attainment of marks rather than assessment of instructional objectives have become all important.

- As grading involves grouping the students according to their attainment levels, it help in categorizing the students as per their attainments of instructional objectives also.
- One of the significant arguments in favour of the grading system is that it creates favourable conditions for classification of students' performance on a more convincing and justifiable scale.
- In order to understand why grading is a better proposition than the marking system, it is necessary to look closely into the various procedures of scaling.
- Grading is a far more satisfactory method than the numerical marking system.
- The justification for the superiority of grading system over marking system is that it signifies individual learner's performance in the form of a certain level of achievement in relation to the whole group.

#### d. Types of Grading System



On the basis of the reference point of awarding grades, grades are classified as **Direct** and **Indirect**, it is also divided into two as **Absolute** and **Relative**. The reference point in former classification is an approach and in the latter, a standard of judgment. Absolute and relative grading come under indirect grading. For better understanding of these their scheme of classification is depicted in the following above figure.

#### ❖ Direct Grading

The process of assessing students' performance qualitatively and expressing it in terms of letter grades directly is called direct grading. This type of grading can be used for assessment of students' performance in both scholastic and co- scholastic areas. However, direct grading is mostly preferred in the assessment of co-scholastic learning outcomes. While evaluation co-scholastic learning outcomes, the important factors are listed first and then a student's performance is expressed in a letter grade. This type of grading minimizes inter- examiner variability and is easy to use when compared to indirect grading. Direct grading has a limitation that it does not have transparency and diagnostic value and does not encourage competition to the extent required.

### ❖ Indirect Grading

In indirect grading, student performance is first assessed in terms of marks and then they are transformed into letter grades. Different modes may be followed while transforming the marks into grades. On the basis of the mode of transformation of marks into grades, there are two types of grading, viz. absolute grading and relative grading. The meaning and relevance of these two types of indirect grading are explained below.

### ❖ Absolute Grading

Let us now examine the methodology of awarding grades in terms of absolute standards. As has been pointed out earlier, absolute grading is based on a pre-determined standard that becomes the reference point for students' performance. In absolute grading, the marks are directly converted into grade on the basis of a pre-determined standard. Absolute grading can be on a three-point, five-point or nine-point scale for primary, upper primary and secondary stages respectively.

#### i. Three-Point Scale

Students are classified into three groups as above average, average and below average on the basis of pre-determined range of score as shown in below table.

**Three-tier classification and their meaning**

Range of marks	Grade	Description
60% and above	A	Above Average
30%- Less than 60%	B	Average
Below 30%	C	Below Average

#### ii. Five- Point Scale

Students are classified into five groups, distinction, first division, second division, third division and unsatisfactory on the basis of pre-determined range of score as shown in below table.

### Three- tier classification and their meaning

Range of marks	Grade	Description
75% and Above	A	Distinction/ Excellent
60% - Less than 75%	B	First Division/Good
45% - Less than 60%	C	Second Division/ Average
33% - Less than 45%	D	Third Division/ Below Average
Below 33%	E	Unsatisfactory/ Poor

### iii. Nine- Point Scale

In absolute grading the range of absolute marks or percentage of marks need not necessarily be of equal size. The range of marks as a pre-determined standard for classifying students into different groups may be taken as arbitrary. In a nine- point grading scale, the students may be classified into nine groups, namely, outstanding, excellent, very good, good, above average, below average, marginal and unsatisfactory. An example of nine-point absolute grading is provided in below table.

### Nine- tier classification and their meaning

Sl. No.	Range of marks	Grade	Description
1.	90% and Above	A	Outstanding
2.	80% - Less than 90%	B	Excellent
3.	70% - Less than 80%	C	Very Good
4.	60% - Less than 70%	D	Good
5.	50% - Less than 60%	E	Above Average
6.	40% - Less than 50%	F	Average
7.	30% - Less than 40%	G	Below Average
8.	20% - Less than 30%	H	Marginal
9.	Below 20%	I	Unsatisfactory

### Merits of Absolute Grading

- Negative effects of pass/ fail eliminated.
- No grade signifies failure of students.
- Simple and straight forward.
- Meaning of each grade is distinctively understandable.
- Students have the freedom to strive for highest possible grade.

- No complications.
- Easy for teachers to award grades as per pre-determined range of marks.

### **Demerits of Absolute Grading**

- Grade may not be comparable.
- Distribution of marks varies from one subject to another and from one year to another.
- Number of students placed in different categories will differ from subject to subject and year to year.
- Distribution of marks is taken on its face value.
- Errors in measurement due to subjectivity are ignored.
- Different categories are arbitrarily decided.

### **e. Limitation of Grading System**

Grading system is considered as the most viable and systematic to assess the outcomes of teaching- learning process, it is not free from criticism due to several reasons which are listed below;

- There is a possibility of different examiners interpreting the standard differently resulting in inter-examiner variability.
- Grading stipulates strict adherence to pre-defined criteria.
- In absolute grading, the students are put into different categories on the basis of pre-determined range of scores.
- Relative grading, though scientific is considered somewhat complicated for teachers, especially when they are not equipped to implement it in their classes.
- Grades are often awarded without employing both multiple criteria and multiple sources of information.
- The percentage of students belonging to different grades is pre-determined and the grades are not awarded on the basis of individual student's performance but are decided on the basis of performance of students in a larger group.
- Lack of uniform policy on grading across different State Boards of Education creates a problem of compatibility of grade awarded on different criteria in different board examination.

### **6.6.1 Non-Detention Policy**

Section 16 of the RTE mandates that no child can be detained or held back in a class until the completion of his/her elementary education. The corollary of this is continuous and comprehensive evaluation prescribed in Section 29 (h), more commonly known as CCE. These provisions have given a legal status to the principle of no detention and the development of a progressive and holistic evaluation framework, enunciated in the National Policy on Education, 1986 and also the National Curriculum Framework, 2005.

In 2012, the Ministry for Human Resource Development (MHRD) crystallized its position on the NDP as follows, “The ‘no detention’ provision is made because examinations are often used for eliminating children who obtain poor marks. Once declared ‘fail’, children either repeat grade or leave the school altogether. Compelling a child to repeat a class is demotivating and discouraging.” It was also clarified that the CCE is “a procedure that will be non-threatening, releases the child from fear and trauma of failure and enables the teacher to pay individual attention to the child’s learning and performance”. As asserted by several educationists and academics, the no-detention policy (NDP) and CCE are based on sound principles of pedagogy and assessment, recognised world-wide. They are thus a welcome change to the exam-centric culture prevalent in Indian schools.

There are also very strong equity considerations behind the NDP policy, especially for children from low-income families and girls. Failure for these children implies dropping out, as alluded to in the MHRD position. In fact, wastage in the schooling system due to high repetition and high dropout rates has been a major concern since the 1990s. The no-detention clause in the RTE Act seeks to address that concern.

Besides, research evidence indicates that detention of students by a year or more does not improve learning. Even the Geeta Bhukkal Committee a sub-committee under CAGE set up to look into this matter admits that there is no research anywhere in the world which establishes that repeating a year helps children perform better. But research does say that repeating has adverse academic and social effects on the child.



### **6.6.2 Objectivity Vs Subjectivity**

Objective is a statement that is completely unbiased. It is not touched by the speaker's previous experiences or tastes. It is verifiable by looking up facts or performing mathematical calculations. It is important to be objective when you are making any kind of a rational decision. It might involve purchasing something or deciding which job offer to take. You should also be objective when you are reading, especially news sources. Being objective when you are meeting and having discussions with new people helps you to keep your concentration focused on your goal, rather than on any emotions your meeting might trigger. It sounds like the word object. You should be objective whenever you are discussing an object, something concrete that you can hold or touch. The facts that make up your objective statement should also be concrete solid objects.

Subjective is a statement that has been colored by the character of the speaker or writer. It often has a basis in reality, but reflects the perspective through which the speaker views reality. It cannot be verified using concrete facts and figures. It can be used when nothing tangible is at stake. When you are watching a movie or reading a book for pleasure, being subjective and getting caught up in the world of the characters makes your experience more enjoyable. If you are discussing any type of art, you have to keep in mind that everyone's opinions on a particular piece are subjective. It is just the opposite. You can't point to subjective subjects. They are all in your head and your past experiences. Subjective opinions are ephemeral and subject to any number of factors that can range from facts to emotions.

#### **a. Measures of Performances of Objectivity and Subjectivity**

Measuring and appraising the quality of a performance can be a challenging task particularly where the performance is not easily timed or measured.

#### **b. Objective performance measures**

- Objective performance measures are those that involve an impartial measurement, that is, without bias or prejudice.

- Objective performance measures include timing measures such as stopwatches or electronic timing devices or distance measures such as measuring tapes to determine the winner of an event.
- In these situations the performance appraisal is not subject to personal opinion or interpretation of results and it is a clear objective measure.

**c. Subjective performance measures**

- Subjective performance measures are influenced by the observer's personal judgment of how the skill was performed.
- These measures are often criticised and scrutinized as they are open to interpretation and opinion.
- Subjective measures often refer to the quality and style of performance such as scoring of dance and gymnastics.
- While a numerical score may be used it is open to interpretation of the judge not a clear cut measure.

**Check your Progress-2**

4. Give the meaning of Grading.

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5. Explain any one of the demerits of Marking System..

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6. Explain the purpose of Non-detention Policy of section 16 under RTE.

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## 6.7 PSYCHOLOGICAL TESTS

Psychological test refers to the administration of psychological tests. A psychological test is "an objective and standardized measure of a sample of behavior". The term sample of behavior refers to an individual's performance on tasks that have usually been prescribed beforehand. The samples of behavior that make up a paper-and-pencil test, the most common type of test, are a series of items. Performances on these items produce a test score. A score on a well-constructed test is believed to reflect a psychological construct such as achievement in a school subject, cognitive ability, aptitude, emotional functioning, personality and etc. Differences in test scores are thought to reflect individual differences in the construct the test is supposed to measure. The technical term for the science behind psychological testing is psychometrics.

### ➤ Principles of Psychological Test

Psychological tests are given below:

- **Standardization** - All procedures and steps must be conducted with consistency and under the same environment to achieve the same testing performance from those being tested.
- **Objectivity** - Scoring such that subjective judgments and biases are minimized, with results for each test taker obtained in the same way.
- **Test Norms** - The average test score within a large group of people where the performance of one individual can be compared to the results of others by establishing a point of comparison or frame of reference.
- **Reliability** - Obtaining the same result after multiple testing.
- **Validity** - The type of test being administered must measure what it is intended to measure.

### ➤ Types of Psychological Tests

There are several broad categories of psychological tests, there are given below:

### **6.7.1 IQ/Achievement Tests**

IQ tests purport to be measures of intelligence, while achievement tests are measures of the use and level of development of use of the ability. IQ (or cognitive) tests and Achievement tests are common norm-referenced tests. In these types of tests, a series of tasks is presented to the person being evaluated, and the person's responses are graded according to carefully prescribed guidelines. After the test is completed, the results can be compiled and compared to the responses of a norm group, usually composed of people at the same age or grade level as the person being evaluated. IQ tests which contain a series of tasks typically divide the tasks into Verbal (relying on the use of language) and performance, or non-verbal (relying on eye-hand types of tasks, or use of symbols or objects). Examples of verbal IQ test tasks are vocabulary and information (answering general knowledge questions). Non-verbal examples are timed completion of puzzles (object assembly) and identifying images which fit a pattern (matrix reasoning).

### **6.7.2 Attitude Tests**

Attitude test assess an individual's feelings about an event, person, or object. Attitude scales are used in marketing to determine individual (and group) preferences for brands, or items. Typically attitude tests use either a Thurstone scale, or Likert scale to measure specific items.

### **6.7.3 Neuropsychological Tests**

These tests consist of specifically designed tasks used to measure a psychological function known to be linked to a particular brain structure or pathway. Neuropsychological tests can be used in a clinical context to assess impairment after an injury or illness known to affect neurocognitive functioning. When used in research, these tests can be used to contrast neuropsychological abilities across experimental groups.

### **6.7.4 Personality Tests**

Psychological measures of personality are often described as either objective tests or projective tests. The terms "objective test" and "projective test" have recently come under

criticism in the Journal of Personality Assessment. The more descriptive "rating scale or self-report measures" and "free response measures" are suggested, rather than the terms "objective tests" and "projective tests," respectively.

#### **6.7.5 Objective Tests (Rating scale or self-report measure)**

Objective tests have a restricted response format, such as allowing for true or false answers or rating using an ordinal scale. Prominent examples of objective personality tests include the Minnesota Multiphasic Personality Inventory, Millon Clinical Multiaxial Inventory, Child Behavior Checklist, Symptom Checklist and the Beck Depression Inventory.

#### **6.7.6 Projective Tests (Free response measures)**

Projective testing became a growth industry in the first half of the 1900s, with doubts about the theoretical assumptions behind projective testing arising in the second half of the 1900s. Some projective tests are used less often today because they are more time consuming to administer and because the reliability and validity are controversial.

As improved sampling and statistical methods developed, much controversy regarding the utility and validity of projective testing has occurred. The use of clinical judgment rather than norms and statistics to evaluate people's characteristics has raised criticism that projectives are deficient and unreliable (results are too dissimilar each time a test is given to the same person). However, as more objective scoring and interpretive systems supported by more rigorous scientific research have emerged, many practitioners continue to rely on projective testing. Projective tests may be useful in creating inferences to follow-up with other methods.

#### **6.7.7 Direct Observation Tests**

Although most psychological tests are "rating scale" or "free response" measures, psychological assessment may also involve the observation of people as they complete activities. This type of assessment is usually conducted with families in a laboratory, home or with children in a classroom. The purpose may be clinical, such as to establish a pre-intervention baseline of a child's hyperactive or aggressive classroom behaviors or to observe the nature of a parent-child

interaction in order to understand a relational disorder. Direct observation procedures are also used in research, for example to study the relationship between intrapsychic variables and specific target behaviors, or to explore sequences of behavioral interaction.

### **6.7.8 Interest Tests**

Psychological tests to assess a person's interests and preferences. These tests are used primarily for career counseling. Interest tests include items about daily activities from among which applicants select their preferences. The rationale is that if a person exhibits the same pattern of interests and preferences as people who are successful in a given occupation, then the chances are high that the person taking the test will find satisfaction in that occupation. A widely used interest test is the strong interest inventory, which is used in career assessment, career counseling, and educational guidance.

### **6.7.9 Aptitude Tests**

Psychological tests measure specific abilities, such as mechanical or clerical skills. Sometimes these tests must be specially designed for a particular job, but there are also tests available that measure general clerical and mechanical aptitudes. An example of an aptitude test is the Minnesota Clerical Test, which measures the perceptual speed and accuracy required to perform various clerical duties. Other widely used aptitude tests include the Differential Aptitude Tests (DAT), which assess verbal reasoning, numerical ability, abstract Reasoning, clerical speed and accuracy, mechanical reasoning, space relations, spelling and language usage. Another widely used test of aptitudes is the wonderlic test. These aptitudes are believed to be related to specific occupations and are used for career guidance as well as selection and recruitment.

## **6.8 COMPETITIVE EXAMINATION**

A competitive examination is an examination where candidates are ranked according to their grades. If the examination is open for  $n$  positions, then the first  $n$  candidates in ranks pass, the others are rejected. They are used as entrance examinations for university and college admissions or to secondary schools. Another types are civil service examinations, required for positions in the public sector; the U.S. Foreign Service Exam and the United Nations

Competitive Examination. Competitive examinations are considered an egalitarian way of choosing worthy applicants without risking influence peddling, favoritism or other concerns.

It is surprising that during 14 years of school studies, we are never taught how to study effectively. Every day, new research is being conducted on education, teaching skills and learning methods which we can use to learn scientific ways for note taking, textbook reading, memorizing and effective reviewing. We offer you 12 scientific study skills that can help you get sure-shot success in any competitive entrance exam.

## **6.9 MENACE OF COACHING CENTRES**

There was a time when only those children needed tuition who were not good at studies. But nowadays a number of tuition and coaching centres have cropped up all over the city where crowds of thousands of students can be seen. Because of this system of education, colleges have very low attendance. Instead of going to their colleges in the morning, students prefer to go to these ‘coaching centres’ in the evening. It also deprives them of physical activity which is necessary for growing teenagers.

In most of the coaching centres, tutors are government college teachers. They teach well at coaching centres but do not teach in colleges though they draw a huge amount from the government. The coaching centre teacher does not cover the whole book. These teachers are playing with the careers of students as this teaching methodology deprives them of gaining extra knowledge.

When these students from coaching centres get admission in universities, they face many problems because of being addicted to ready-made ‘notes’ provided by the teachers. The authorities concerned should seriously ponder over this issue and ban all these tuition and coaching centres in order to promote academic activities at our colleges and for the better future of our new generation.

### **i. How to Tackle the Menace of Coaching Classes**

- The mushrooming of private coaching centres all over the country has put the future of conventional education system in schools/colleges and varsities in danger.
- It seems that students and their parents just can't do anything without the crutches of private tuition.
- The worst thing that has happened because of the proliferation of coaching centres like toad stools is a kind of apprehension and inferiority complex among those reluctant to resort to the 'guidance' provided by the coaching classes.
- There was a time, not long ago, when the parents had to meet the principals and the head teachers and convince them to grant permission for private tuition.
- It used to be a matter of concern for the school authorities that the students were having private tuition.
- In other words, the teaching at schools was not good enough, causing students to have a private teacher along with the regular studies in school. The canker of coaching classes has spread far and wide.

Why the students from Indian schools and colleges find it difficult to crack the aptitude tests of foreign universities? The simple answer is the set patterns of education imparted by the coaching classes and no learning in schools and colleges. I often wonder, why don't the net savvy and much more aware parents of today's kids ever take up this issue with the school and college authorities as to why their children should join a coaching class when they're paying through nose for school and college education of their wards? Are they alive to the fact that the education ministry of India has set up a cell for school and higher education that sees to it that every grievance of students and parents is addressed on a priority basis? Do we know that coaching classes are actually illegal and to open a coaching class, the teacher has to take the permission from the education ministry and if he/she gets to open a coaching centre, s/he will have to resign from the job of a teacher at an academic institute. It's been clearly stated that a teacher can't continue with teaching at a school/college apart from teaching privately.



## **6.10 TRENDS IN ASSESSMENT AND EVALUATION**

We want to talk about trends that, over the next decade are likely to turn assessment in teaching upside down and we will make the statement outrageous render obsolete almost everything that's currently going on in testing, both in student testing and teacher testing. I suggest that there is a terrific mismatch between what we're on the brink of today and what is currently in place in both assessment of student learning and in assessment of teaching. A whole series of forces and trends is bearing down on education that portends a sea change. The ground underneath us is changing dramatically and rapidly. In this regard, one might think of Thomas Kuhn's work on the logic of scientific discovery. Kuhn makes a distinction between normal science and paradigm-shattering science in which, in the course of scientific progress, a long-standing, stable paradigm that organizes research and work in a given field is suddenly shattered through a discovery that introduces a new model or paradigm that then organizes the next wave of research and inquiry.

### **a. Streams of Change**

There are four broad streams that are flowing together to dramatically alter the current trend in assessment. Those are given below.

1. The serious attempt to introduce new goals or objectives for learning in schools;
2. Emerging work on the nature of teaching and learning that suggests a serious mismatch between conceptions of teaching and learning and the conceptions of teaching and learning in assessment instruments;
3. Changes in the role of the teacher that are likely to be necessary and, consequently, a different frame of reference for what ought to be assessed about teaching; and
4. Emerging research on assessment procedures and methods.

Changes along all four of these dimensions are likely to flow together to produce dramatic changes in assessment. I will not speak about the last one, changes in assessment procedures, as that is not an area of my expertise. And I should also say that when I speak about assessment, I do not want to restrict myself to state testing programs, but want to include the way local school districts and schools organize evaluation practices of teachers so one might think broadly about the way in which we institutionalize efforts to assess teaching and learning at

various levels of the system. That would include, of course, large-scale testing programs from the state level, the national level, and so on.

## **b. Main Trends within Assessment and Evaluation**

- ***Expansion of educational evaluation in school systems:***

Most countries are conferring a strategic role to evaluation and assessment as indispensable tools for improvement, accountability, educational planning and policy development and are expanding their use. This expansion results from increased demands for effectiveness, equity and quality in education to meet economic and social needs. The greater importance of evaluation and assessment has involved the creation of dedicated agencies which assume a central role in the governance of the evaluation and assessment framework.

- ***Greater variety of evaluation and assessment activities:***

Countries are increasingly developing more comprehensive evaluation and assessment frameworks with more resources devoted to evaluation components other than student assessment (i.e. school evaluation, school leader appraisal, teacher appraisal and education system evaluation). There has been an expansion of student standardised assessment, increased policy focus on consolidation of formative assessment practices and support for assessment as learning. System-level policies are the growing importance of performance data, particularly relating to student outcomes, to inform school and classroom practices.

- ***The rise of educational measurement and indicators development:***

The stronger focus on measuring student outcomes is reflected by the introduction of national standardised assessments for students in many countries. Also, for the purpose of monitoring education systems and evaluating school performance, data are increasingly complemented by a wide range of education indicators based on demographic, administrative and contextual data collected from individual schools. Most countries have developed comprehensive national indicator frameworks. It is now also common practice to report statistics and indicators in education in an annual publication. International benchmarking is also increasingly common.

- ***Larger and more varied uses are given to evaluation and assessment results:***

As a tool for understanding better how well students are learning, providing information about education performance and for improving school and teaching practices. Increasingly results are used to hold policy makers, school leaders and teachers accountable and for formative purposes. School leaders, teachers and policy makers are using evaluation results to identify areas where schools are performing well, and where they may need to improve. Increasingly classroom-based assessment is seen as having a formative role. There is increasing recognition of and focus on building capacity to collect and use data for improvement.

- ***Accountability as a purpose of evaluation and assessment is gaining in importance:***

There is a growing trend of public reporting, including the publication of standardised student assessment results at the school level, the publication of school inspection reports, school annual reports, and system level reports providing an assessment of the state of education. Evaluation and assessment results are increasingly used to reward or sanction the performance of individual school agents. This goes alongside the expansion of school external evaluation and teacher appraisal procedures. Another development is the greater variety of accountabilities for school agents.

- ***Greater reliance on educational standards:***

The focus on student learning outcomes has, in many countries, driven the establishment or underlined the importance of educational standards for the quality of the work of schools and school agents, and encouraged means for monitoring progress towards those standards. In many countries, there is growing emphasis on the development and use of ambitious educational standards as the basis of assessment and accountability.

- ***Assessment is becoming more international:***

National education debates are increasingly shaped by international comparisons, particularly of student performance in international student surveys. International comparative data put countries under pressure to attain higher levels of performance. The expansion of international assessment has also significantly contributed for some countries to introduce national standardised assessments.

- ***Greater technological sophistication:***

Enables more individualised assessment approaches; better assessment of cognitive skills such as problem solving; reliability in marking and reduced cost to administer student assessment; the development of rapid-assessment, and data information systems providing new opportunities for information sharing.

### **6.10.1 Online Examination**

Online examination is also called online assessment. Online assessment is the process used to measure certain aspects of information for a set purpose where the assessment is delivered via a computer connected to a network. Most often the assessment is some type of educational test. Different types of online assessments contain elements of one or more of the following components, depending on the assessment's purpose: formative, diagnostic, or summative. Instant and detailed feedback, as well as flexibility of location and time, is just two of the many benefits associated with online assessments. There are many resources available that provide online assessments, some free of charge and others that charge fees or require a membership.

The online examination system not only reflects the justification and objectivity of examination, but also releases the workload of teachers, which is accepted by more and more schools, certification organizations and training organizations. Most online examination systems only support several fixed question types and don't allow users define their own question types, so they have poor scalability. This paper proposes a new online examination system, which not only provides several basic question types but also allows users to define their new question types (user-defined question type) through composing of basic question types and/or user-defined question types, which is realized based on the object-oriented conception and composite design pattern. The new online examination system overcomes the shortcoming of old online examination systems and has better extensibility and flexibility.

#### **a. Types of Online Examination**

Online examination is used primarily to measure cognitive abilities, demonstrating what has been learned after a particular educational event has occurred, such as the end of an instructional unit or chapter. When exam practical abilities or to demonstrate learning that has

occurred over a longer period of time an online portfolio is often used. The first element that must be prepared when teaching an online course is examination. Examination is used to determine if learning is happening, to what extent and if changes need to be made.

- **Independent Work**

Independent work is work that a student prepares to assist the instructor in determining their learning progress. Some examples are: exercises, papers, portfolios, and exams (multiple choice, true false, short answer, fill in the blank, open ended/essay or matching). To truly evaluate, an instructor must use multiple methods.

- **Group Work**

Students are often asked to work in groups. With this brings on new examination strategies. Students can be evaluated using a collaborative learning model in which the learning is driven by the students and/or a cooperative learning model where tasks are assigned and the instructor is involved in decisions.

### **6.10.2 Computer - Based Examination**

Computer-based testing (CBT) has become widespread in recent years. Some states now use an online platform as the primary delivery mode for one or more computer-based tests used for accountability purposes. When CBT was emerging in state testing in the early 2000s, Thompson, Thurlow, Quenemoen, and Lehr (2002) examined the implications of CBT for students with disabilities. There was not much literature about the use of CBT for large-scale assessments at that time, and Thompson et al. worked with states to explore what needed to be considered during development for students with disabilities and how states might address the needs of these students for accommodations in a CBT environment.

Since the early 2000s, much has occurred in CBT. CBT seems to have advantages over paper and pencil testing, both for states that run the assessment programs and for the students who participate in them. These advantages are recognized by the U.S. Department of Education, which in one of its major initiatives (Race to the Top Assessment Program), encouraged the development of CBT. There currently is strong interest in CBT and advocates have identified

many positive merits of this approach to assessment including: efficient administration, student preference, self-selection options for students, improved writing performance, built-in accommodations, immediate results, efficient item development, increased authenticity, and the potential to shift focus from assessment to instruction (e.g., Becker, 2006; Salend, 2009; Thompson et al., 2002). CBT also allows new ways of assessing students that move beyond the traditional multiple choice and constructed response items. For example, innovative assessments are now being developed that enable students to manipulate data and role play. Yet, as states move forward with CBT they are discovering that it is important to consider not only the positive benefits, but also potential negative unintended consequences. These include, for example, the possibility that additional training will be needed for students with disabilities to interact successfully with computers and the challenges of determining the best way to present some accommodations such as screen readers.

### **Check your Progress-3**

7. Give any one of the principles of psychological tests.

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8. How Online Examination is assessed?

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9. Give any one of the merits of Computer-Based Test.

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## **6.11 LET US SUM UP**

So far you have learnt when and what type of test will be conducted in schools by the teacher. The nature of board examinations and entrance test were explained in detail. The functions of state and national achievement surveys were explained. You have understood the purpose of question bank, the merits and demerits of marking and grading system. The purpose of non-detention policy and its objectivity and subjectivity were also learnt by you in detail. You have understood the scope and use of psychological tests and the purpose of entrance test. The modern trends in assessments and evaluation such as online examination and Computer - based examination were also learnt by you in detail.

## **6.12 ANSWERS TO ‘CHECK YOUR PROGRESS’**

1. a). Terminal
2. In India, board examinations refer to the public examinations that occur at the end of the 9<sup>th</sup> to 10<sup>th</sup> grade education (SSC), or at the end of the 11<sup>th</sup> to 12<sup>th</sup> grade education (HSC).
3. An entrance examination is an examination that many educational institutions use to select students for admission.
4. Grading is a process of classifying students based on their performance into groups with the help of predetermined standards, expressed in a symbolic form i.e., letters of English alphabet.
5. Inter and intra-examiner variability in marking of scripts is so high that it decreases reliability of the scores.
6. Section 16 of the RTE mandates that no child can be detained or held back in a class until the completion of his/her elementary education.
7. Any one of the following: Standardization, Objectivity, Test Norms, Reliability and Validity
8. The assessment is made via a computer connected to a network.
9. Any one of the following: Efficient Administration, student preference, self-selection options for students, improved writing performance, built-in accommodations, immediate results, efficient item development, increased authenticity, and the potential to shift focus from assessment to instruction

### 6.13 UNIT END EXERCISES

- Give the meaning of Half- Yearly, Annual Examinations, board examinations and Entrance tests
- What do you mean by Question Bank?
- Highlight the advantages of grading system over marking system.
- Define Non- Detention Policy
- Differentiate Objectivity Vs subjectivity.
- State the meaning of psychological tests.
- Explain Online Examination and Computer-Based Examination

### 6.14 SUGGESTED READINGS

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## **UNIT-VII**

# **STATISTICS AND EDUCATIONAL ASSESSMENT**

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### **STRUCTURE**

#### **7.1 INTRODUCTION**

#### **7.2 LEARNING OBJECTIVES**

#### **7.3 RAW SCORES**

#### **7.4 FREQUENCY DISTRIBUTION**

#### **7.5 MEASURES OF CENTRAL TENDENCY**

##### **7.5.1 Mean**

##### **7.5.2 Median**

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##### **7.5.4 Limitations of Mean, Median and Mode**

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##### **7.6.1 Standard Deviation**

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## 7.1 INTRODUCTION

The raw scores as such will not give any meaning. When the suitable statistical techniques are applied to process the raw data to drive the results, then only it can be interpreted with meaningful conclusion. In the present chapter, nature of raw scores and frequency distributions are explained. The different nature of measures of central tendency such as mean, median and mode and measures of variability like standard deviation, quartile deviation and range were explained. To find out the relationship among the variables, the utilization correlation coefficient likes Rank Order and Product Moment Correlation were explained. The results can be highlighted through various graphical representation of data like Line, Bar and Pie Diagrams, Histogram, Frequency Polygon and Cumulative Frequency Curve to impress the learner about the nature of the variable. Fundamental ideas of standard scores were also explained in this chapter. Further elaboration was made on Percentiles, Percentile Rank, Percentage Score, Grade Point Averages and Z-Scores regarding its nature.

## 7.2 LEARNING OBJECTIVES

After studying this Unit, you will able to

- describe the meaning of Raw scores and Frequency Distribution
- explain the measuring of Central Tendency like Mean, Median and Mode.
- compute the Measures of Variability like Standard Deviation, Quartile Deviation and Range
- describe the meaning and different types of Correlation Coefficient such as Rank Order and Product Moment Correlation
- Describe the purpose of graphical representation of data like Line, Bar and Pie Diagrams, Histogram, Frequency Polygon and Cumulative Frequency Curve
- State the meaning of percentiles and percentile ranks, percentage score, grade point averages and z-scores

## 7.3 RAW SCORES

Raw scores are simply the number questions or problems the student answered or solved correctly. Without knowing how many questions were on the test or the point value of each question, raw scores are impossible to decipher in terms of percentile, grade, or measured progress.

In statistics and data analysis, a raw score is an original datum that has not been transformed. This may include, for example, the original result obtained by a student on a test (i.e., the number of correctly answered items) as opposed to that score after transformation to a standard score or percentile rank or the like.

Often the conversion must be made to a standard score before the data can be used. For example, an open ended survey question will yield raw data that cannot be used for statistical purposes as it is; however a multiple choice question will yield raw data that is either easy to convert to a standard score, or even can be used as it is.

#### **7.4 FREQUENCY DISTRIBUTION**

In statistics, a frequency distribution is a table that displays the frequency of various outcomes in a sample. Each entry in the table contains the frequency or count of the occurrences of values within a particular group or interval, and in this way, the table summarizes the distribution of values in the sample.

A frequency distribution shows us a summarized grouping of data divided into mutually exclusive classes and the number of occurrences in a class. It is a way of showing unorganized data e.g. to show results of an election, income of people for a certain region, sales of a product within a certain period, student loan amounts of graduates, etc. Some of the graphs that can be used with frequency distributions are histograms, line charts, bar charts and pie charts. Frequency distributions are used for both qualitative and quantitative data.

#### **7.5 MEANING OF MEASURES OF CENTRAL TENDENCY**

You have an idea generally that an average which is very often used in daily practice. What is that average? You say an average mark of the pupil, an average height or weight of the pupils, an average income of the family and etc. The above concepts average indicates a single value which is the outcome of the total measure. The above typical measures indicate that the values in the data concentrate at the centre or somewhere in the middle of the distribution. Such measures are called measures of central tendency. Tendency of occurrence somewhere in the middle. Here, you are representing the performance of the group as a whole by the single measure and enable you to compare two or more groups in terms of their performance. It

describes the characteristics of the given data. Of the many averages, three have been selected as the most useful methods in educational research. They are the mean, median and mode.

#### a. Types of Measure of Central Tendency



### 7.5.1 Mean

#### i. Calculation of Ungrouped Data

The mean of distribution is commonly understood as the arithmetic average. It is computed by dividing sum of all the scores by the number of measures. We denote the mean by 'M', the first letter of the word Mean. The formula is,

$$M = \frac{\sum X}{N}$$

Where,

M = Mean

$\Sigma$  = Sum of

X = Score in the distribution

N = Number of measures

**Ex.:** 60, 63, 66, 69, 72, 75, 78, 81, 84 = 648

$X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 + X_9$  i.e.,  $X_1$  to  $X_9$  Sum

$\Sigma X = 657$ ,  $N=9$

$$M = \frac{\sum X}{N} = \frac{648}{9} = 72.$$

#### ii. Calculation of Mean from Grouped Data

When the scores are more in the given data, the above method is not useful then the given data is to be grouped into frequency distribution and then mean is calculated by different methods namely, the Short Method and Long Method.

## Worked Examples

**Example 1:** Computation of the mean from the data grouped into frequency distribution  
(Short Method)

In finding out the mean by long method finding out the product of  $fX$  is a labourious process and time consuming. Therefore the alternate is being adopted to minimize the labourious process. The alternate is short method. (We “guess” or “assume” the mean and apply the correction in order to get the real mean).

Class Interval	Midpoint	f	$X^1$	$fX^1$	
95-99	97	1	5	5	+ 37
90-94	92	2	4	8	
85-89	87	3	3	9	
80-84	82	4	2	8	
75-79	77	7	1	7	
70-74	72 (AM)	11	0	0	
65-69	67	6	-1	-6	-22
60-64	62	3	-2	-6	
55-59	57	2	-3	-6	
50-54	52	1	-4	-4	

$$N = 40 \quad \Sigma fX^1 = 15$$

$$M = A.M. + C.i$$

Where A.M. is assumed mean

$$C \text{ is the correction} = \frac{\Sigma fX^1}{N}$$

‘i’ is the size of the class interval

$$A.M. = 72$$

$$C = \frac{15}{40} = 0.38$$

$$M = A.M. + C.i$$

$$= 72 + 0.38 \times 5$$

$$= 73.9$$

**Steps:**

- 1) Find out the midpoints of the class interval.
- 2) Select the midpoint of the class interval as the assumed mean somewhere near the centre of the distribution and if possible the class interval which contains the highest frequency.
- 3) Calculate the deviations of all the X values from the assumed mean.

$$\text{i.e., deviation of the score} = \frac{\text{score} - \text{assumed mean}}{\text{size of the class interval}}$$

Call that value as  $X^1$ .

- 4) Find the  $fX^1$  value and add the values denote it as  $\sum fX^1$
- 5) Calculate the 'C' the correction by dividing  $\sum fX^1$  by N.

$$\text{i.e., } C = \frac{\sum fX^1}{N}$$

- 6) Multiply 'C' by the interval length 'i' to get C.i.
- 7) Use the formula for the calculation.

$$\text{Mean} = \text{A.M.} \pm \text{C.i.}$$

The result we obtain is the arithmetic mean of the given data.

**Example 2:** Computation of the mean from the data grouped into frequency distribution

(Long Method)

Class Interval (C.I.)	Midpoint (X)	Frequency (f)	fX
95-99	97	1	97
90-94	92	2	184
85-89	87	3	261
80-84	82	4	328
75-79	77	7	539
70-74	72	11	792
65-69	67	6	402
60-64	62	3	186
55-59	57	2	114
50-54	52	1	52
		40	2955

$$N = 40 \quad \sum fX = 15$$

$$M = \frac{\sum fX}{N} = \frac{2955}{40} = 73.88$$

**Steps:**

- 1) Find out the midpoints of the each class interval by taking the average of the class interval limits.

$$\text{Midpoint} = \frac{\text{Lower limit} + \text{Upper limit}}{2}$$

Indicate these values by X

- 2) Multiply the midpoints X by the corresponding frequencies of the class interval. Note the product as fX.
- 3) Find out the sum of all the products mentioned in as  $\sum fX$ .
- 4) Divide the  $\sum fX$  by the total number of frequencies.
- 5) Calculate the 'C' the correction by dividing  $\sum fX^1$  by N.

**iii. Advantages of the Mean:**

- Reflects the values of all the scores in the distribution.
- Has many desirable statistical properties
- Is the most reliable for drawing inferences, and the easiest to use in
- Advanced statistical techniques.

**iv. Disadvantages of the Mean:**

- Usually not an actual score in the distribution.
- Not appropriate for use with ordinal data.
- Can be misleading when used to describe a skewed distribution.
- Can be strongly affected by even just one very extreme score (i.e., an outlier).

**7.5.2 Median**

Median is the middle most point of a distribution or it is a midpoint in the given series. In other words, in the distribution the half of the values lies below and above the midpoint. It is measure of position rather than of magnitude. It is the 50<sup>th</sup> percentile point in the given distribution.

**i. Calculation of Ungrouped Data**

The scores have to be arranged either in ascending or descending order. Find out the middle score by dividing the total scores by two. Count from one end of the series to find out the below and above which N/2 of scores lie. This point is the median.

**Example:** 6, 7, 8, 9, 10, 11, 12. Here there are seven values. The middle score in the series is 9. Because, below and above 9, there are three values. In computation two situations arise. When N is odd and when N is even.

- 1) When the number is odd: If we have an odd score and if no scores are repeated, the median is the middle value.
- 2) When the number is even: If we have the even scores, the median will become the average of the two middle values.

Ex: 5, 6, 7, 8, 9, 10, 11, 12. The median  $\frac{(8+9)}{2} = \frac{17}{2} = 8.5$ . If the scores repeated in the series, we have to use interpolation technique to obtain the median value.

## ii. Calculation of Grouped Data

When the data is classified into frequency distribution, the median can be computed by using the formula given below.

$$\text{Median} = l + \left[ \frac{\frac{N}{2} - F}{f_m} \right] i$$

**Where**

$l$  = Exact lower limit of the class interval upon which the median lies.

$\frac{N}{2}$  = One- half of the total number of scores.

$F$  = Sum of the scores on all the class intervals below  $l$ .

$f_m$  = Frequency of the interval where the median lies.

$i$  = Size of the class interval.



### Worked Example

Computation of the median for the grouped data.

Class Interval	f	Cum. f
95-99	1	40
90-94	2	39
85-89	3	37
80-84	4	34
75-79	7	30
70-74	11	23
65-69	6	12
60-64	3	6
55-59	2	3
50-54	1	1
	<b>N= 40</b>	

#### Steps:

- 1) Find out the cumulative frequency of each class interval by adding the subsequent frequencies of the class interval.
- 2) Find  $\frac{N}{2}$ , i.e., one- half of the cases in distribution, i.e.,  $\frac{40}{2} = 20$ ,  $N= 20$ .
- 3) Our median lies in the class interval 70-74. Therefore, Lower limit of this class interval 1 is 69.5.
- 4) F- Sum of the frequencies on all the class interval below 1 is 12.
- 5) fm- Frequency of the class interval where our median lies is 11 .

$$\text{Median} = 1 + \left[ \frac{\frac{N}{2} - F}{f_m} \right] i$$

Substituting the values in the given formula we get,

#### Where

$$1 = 69.5, \frac{N}{2} = 20, F = 12, f_m = 11, i = 5$$

$$\begin{aligned}\text{Median} &= 69.5 + \left[ \frac{20-12}{11} \right] 5 \\ &= 69.5 + \left[ \frac{8}{11} \right] 5 \\ &= 69.5 + \frac{40}{11} \\ &= 69.5 + 3.64 \\ &= 73.14\end{aligned}$$

### iii. Advantages of the Median

- Can be used with either ordinal or interval/ratio data.
- Can be used even if there are open-ended categories or undeterminable scores on either side of the distribution.
- Provides a good representation of a typical score in a skewed distribution; is not unduly affected by extreme scores.
- Minimizes the sum of the absolute deviations (i.e., the sum of score distances from the median -- ignoring sign -- is less than it would be from any other location in the distribution).

### iv. Disadvantages of the Median

- May not be an actual score in the distribution (e.g., if there are an even number of scores, or tied scores in the middle of the distribution).
- Does not reflect the values of all the scores in the distribution (e.g., an extreme score can be moved even further out without affecting the median).
- Compared to the mean, it is less reliable for drawing inferences about a population from a sample, and harder to use with advanced statistics.

### 7.5.3 Mode

The mode is defined as the element that appears most frequently in a given set of elements. Using the definition of frequency given above, mode can also be defined as the element with the largest frequency in a given data set. For a given data set, there can be more than one mode. As long as those elements all have the same frequency and that frequency is the highest, they are all the modal elements of the data set.

#### Example:

Find the mode of the following data set: 48   44   48   45   42   49   48

#### Solution:

The mode is 48 since it occurs most often.

#### Steps:

1. It is possible for a set of data values to have more than one mode.
2. If there are two data values that occur most frequently, we say that the set of data values is bimodal.

3. If there is no data value or data values that occur most frequently, we say that the set of data values has no mode.

#### i. Calculation of Grouped Data

As we saw in the selection on data, grouped data is divided into class interval. We have defined mode as the element which has the highest frequency and the mode itself, which calculate from the modal class interval using the formula below.

$$Mode = L + \left( \frac{f_1 - f_0}{2 f_1 - f_0 - f_2} \right) \times h$$

#### Where

L = the lower class limit of the modal class

$f_1$  = the frequency of the modal class

$f_0$  = the frequency of the class before the modal class in the frequency table

$f_2$  = the frequency of the class after the modal in the frequency table

h = the class interval of the modal class

#### Worked Example

Find the modal class and the actual mode of the data set below,

Class Interval	Frequency
1-3	7
4-6	6
7-9	4
10-12	2
13-15	2
16-18	8
19-21	1
22-24	2
25-27	3
28-30	2

$$Mode = L + \left( \frac{f_1 - f_0}{2 f_1 - f_0 - f_2} \right) \times h$$

**Where**

$$L = 10, f_1 = 9, f_0 = 4, f_2 = 2, h = 3$$

$$\begin{aligned}\text{Mode} &= 10 + \left( \frac{9 - 4}{(2 \times 9) - (2 - 4)} \right) \times 3 \\ &= 10 + \left( \frac{5}{12} \right) \times 3 \\ &= 10 + 1.25 \\ &= 11.25\end{aligned}$$

**ii. Advantages of the Mode**

- Easy to find.
- Can be used with any scale of measurement.
- The only measure that can be used with a nominal scale.
- Corresponds to actual score in the distribution.

**iii. Disadvantages of the Mode** (the following apply when the mode is used with ordinal or Interval/ratio data):

- Generally unreliable, especially when representing a relatively small
- Population (can change radically with only a minor change in the distribution).
- Can be misleading; the mode tells you which score is most frequent, but
- Tells you nothing about the other scores in the distribution (radical changes can be
- Made to the distribution without changing the mode).
- Cannot be easily used in conjunction with inferential statistics.

**7.5.4 Limitations of Mean, Median and Mode**

**The Mean** is the most stable measure of the central tendency, easy to understand and easy to calculate. It takes all values of data into consideration. It is the best measure to estimate the population values from sample values.

**The Median** is the middle most point in the distribution, also the best measure of central tendency and when extreme scores affect the mean, the best measure is the median and also when the measure of the distribution is open ended, i.e., when the lower limit of the lowest class

interval and upper limit of the highest class interval is not known. But like the mean, the median cannot be subjected to mathematical operations.

**The Mode** is the easiest measure of central tendency to calculate and understand. It can be identified by simple observation. It corresponds to the highest frequency of the frequency which occurred more frequently in the distribution mode also cannot be applied for mathematical operations like the median. Mode can be used with nominal, ordinal and interval scales of measures. Where mean and median can be used with interval or ratio scales of measurements.

#### **Check your Progress-1**

40. What are the Measures of Central Tendency?

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41. Which is the formula used to calculate Mean?

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42. Find the mode of the following data set: 45    44    45    48    42    49    45.

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### **7.6 MEASURES OF VARIABILITY**

The average of the standard deviation of the measures from their mean is known as the variance. i.e.,  $\sigma^2 = \frac{\sum x}{N}$

$\sigma^2$  = Variance of the sample.

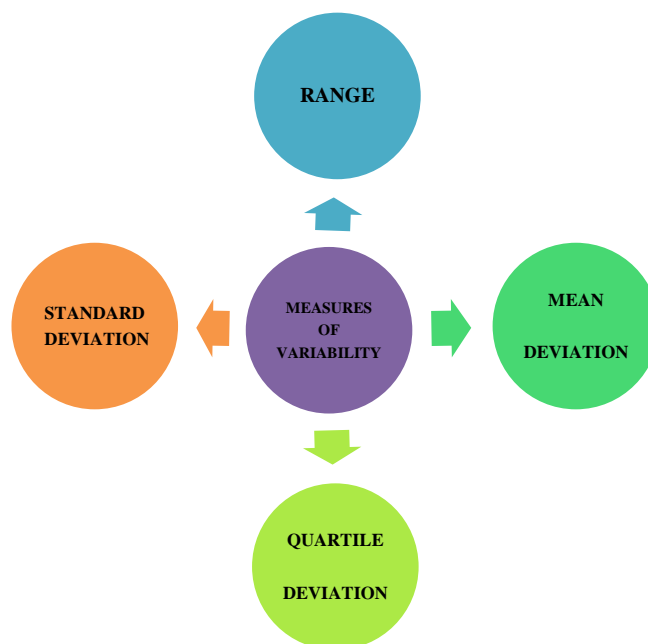
x = Deviation of the raw scores from the mean.

N = Number of measures.

The measures of central tendency give us the single central value representing their entire data but fail to represent the deviations of the values in the distribution. We cannot make out anything about the internal structure of the distribution. That is, how the scores are spread or scattered in a distribution from a given point of measures of central tendency. It is, therefore, necessary to study the variability of the scores in the distribution. In order to give a better shape to the given data it is not enough to find out the measures of central tendency but necessary to make detailed study of the variability of the given data. These measures are known as second order measure, based on the first order measures of mean, median and mode.

#### a. Types of Measures of Variability

Measures of variability have been devised into four measures. There are given below,



#### 7.6.1 Standard Deviation

Standard deviation is the most stable index of variability and used in research and experimental studies. Very often this measure is used in all interpretations without which it is not possible to predict the given data. It differs from the mean deviation in several respects. In standard deviation we avoid the difficulty of signs by squaring the separate deviations and again the squared deviation are used in computing this measure. The standard deviation is taken from

the mean and not from the median or mode. Therefore, the standard deviation is called the root mean squared deviation and represented by the Greek letter Sigma ( $\sigma$ ).

### i. Calculation of Ungrouped Data

Scores	Mean Deviation Score (x)	$x^2$
8	8-14= -6	36
10	10-14= -4	16
12	12- 14= -2	4
14	14-14= 0	0
16	16-14= 2	4
18	18-14= 4	16
20	20-14= 6	36
$\Sigma X = 98$		$\Sigma x^2 = 112$

$$\text{Standard Deviation} = \sqrt{\frac{\Sigma x^2}{N}}$$

$$= \sqrt{\frac{112}{7}} = \sqrt{16} = 4$$

#### Steps:

1. Calculate the mean for the given data.

$$\text{i.e., } M = \frac{\Sigma X}{N} = \frac{98}{7} = 14$$

2. Take the deviations of each score from the mean

$$x = X - M$$

3. Square the deviations and represent it as  $x^2$ .
4. Find the sum of  $x^2$ .
5. Use the formula,

$$\text{Standard Deviation} = \sqrt{\frac{\Sigma x^2}{N}}$$

### ii. Calculation of Grouped Data

Standard deviation for the grouped data can be computed by means of two methods, there are,

1. Long Method

## 2. Short Method

### Worked Examples

#### A. Computation of S.D. for the grouped data by Long Method.

Class Intervals (C.I.)	Mid point (X)	Frequency (f)	fX	Deviation x= X-M	fx	fx <sup>2</sup>
120-122	121	1	121	15.15	15.15	229.52
117-119	118	2	236	12.15	24.30	295.245
114-116	115	3	345	9.15	27.45	251.1675
111-113	112	4	448	6.15	24.60	151.29
108-110	109	5	545	3.15	15.75	49.62
105-107	106	9	954	0.15	1.35	0.20
102-104	103	6	618	-2.85	-15.10	43.004
99-101	100	3	300	-5.85	-17.55	102.67
96-98	97	4	388	-8.85	-37.40	313.29
93-95	94	2	188	-11.85	-23.70	280.85
90-92	91	1	91	-14.85	-14.80	220.52
		N = 40	$\Sigma fX = 4234$			$\Sigma fx^2 = 1837.42$

$$\text{Mean} = \frac{\Sigma fX}{N} = \frac{4234}{40} = 105.85$$

$$\sigma = \sqrt{\frac{\Sigma fx^2}{N}}$$

$$= \sqrt{\frac{1937.42}{40}} = \sqrt{48.44} = 6.96$$

#### Steps:

1. Find the midpoint of the class interval and denote them by X.
2. Find the mean of the group.
3. Take the deviation of mid values from the mean mention if by x.  
i.e., X-M.
4. Multiply x by corresponding class interval frequencies.
5. Find the value of  $fx^2$  again by multiplying  $\frac{fx}{x}$ .
6. Find the sum of  $fx^2$  put it as  $\Sigma fx^2$ .
7. Apply the formula to get the result of the S.D. by long method.



**B. Computation of the S.D. by Short Method for the grouped data.**

Class Intervals (C.I.)	Mid point (X)	Frequency (f)	$x^1$ <u>Score- assumed</u> <u>mean i</u>	$fx^1$	$fx^{1^2}$
120-122	121	1	5	5	25
117-119	118	2	4	8	32
114-116	115	3	3	9	27
111-113	112	4	2	8	16
108-110	109	5	1	5	5
105-107	106	9	0	0	0
102-104	103	6	-1	-6	6
99-101	100	3	-2	-6	12
96-98	97	4	-3	-12	36
93-95	94	2	-4	-8	32
90-92	91	1	-5	-5	25
		<b>N = 40</b>		<b><math>\Sigma fx^1 = -2</math></b>	<b><math>\Sigma fx^{1^2} = 216</math></b>

**Standard Deviation**  $\sigma = i \sqrt{\frac{\Sigma fx^{1^2}}{N}} - C^2$

$$C = \frac{\Sigma fx^1}{N} = \frac{-2}{40} = -0.05$$

$$C^2 = 0.0025$$

Where  $i = 3$ ,  $\Sigma fx^{1^2} = 216$ ,  $C^2 = 0.0025$ ,  $N = 40$

Substituting the values in the formula, we get

$$\begin{aligned}
 &= 3 \sqrt{\frac{216}{40}} - 0.0025 \\
 &= 3 \sqrt{5.4 - 0.0025} \\
 &= 3 \times 2.32 \\
 &= 6.96.
 \end{aligned}$$

Long method is tedious; time consuming and labourious for calculations.

Therefore we use always the short method.

**Steps:**

1. Find the midpoint of the class interval.
2. Find out the  $x^1$  deviations in terms of the class interval.

3. Find out the  $fx^1$  i.e., multiplying the  $x^1$  values by the corresponding frequencies of the class interval.
4. Again find the  $fx^{1^2}$  by multiplying the  $fx^1$  value by  $x^1$ .
5. Apply the formula and find out the result.

### iii. Advantages of the Standard Deviation

- Takes into account all scores in the distribution.
- Provides a good description of variability.
- Tends to be the most reliable measure.
- Plays an important role in advanced statistical procedures.

### iv. Disadvantages of the Standard Deviation

- Very sensitive to extreme scores or outliers.
- Cannot be calculated with undeterminable or open-ended scores.

## 7.6.2 Quartile Deviation

We know already that the median divides the distribution into two equal parts in such a way half of the measures in the distribution lie above and below the median. This concept is extended in determine the measure are called the quartiles. Mainly we consider three such quartiles which are denoted by  $Q_1$ ,  $Q_2$  and  $Q_3$ .

$Q_1$  is called the first quartile, where  $1/4^{\text{th}}$  of the measures lie in the distribution below it.

$Q_2$  is called the second quartile, and it is nothing but the median measure of a distribution. where  $1/2$  of the measures lie in the distribution below it.

$Q_3$  is referred as the third quartile or the upper quartile which divides the distribution in such a way that  $3/4^{\text{th}}$  of the measures lie below that point.

The quartile deviation  $Q$  is one- half of the scale distance between the  $75^{\text{th}}$  percentile  $Q_3$  and  $25^{\text{th}}$  percentile  $Q_1$  in a frequency distribution. Thereby quarter deviation  $Q$  is found from the formula.

$$Q = \frac{Q_3 - Q_1}{2}$$

### i. Calculation of Ungrouped Data

To find  $Q_1$  and  $Q_3$  from the order data we must find the points below the 25 percent and 75 percent of the measures lie.

**Example:** if there are 20 total measures  $Q_1$  would be the point below which 25 percent of 20 measures lie.

$$\text{i.e., } \frac{25}{100} \times 20 = 5$$

and  $Q_3$  would be the point below which 75 percent of 20 scores lie.

$$\text{i.e., } \frac{75}{100} \times 20 = 15$$

$Q_1$  would be half way between the fifth and sixth score and  $Q_3$  would be half way between 15<sup>th</sup> and 16<sup>th</sup> scores.

### ii. Calculation of Grouped Data

Quartile deviation can be computed by using  $Q_1$  and  $Q_3$  measures and then it will be calculated by means of the appropriate techniques as given in the worked examples.

It is clear, we must first compute the 25<sup>th</sup> and 75<sup>th</sup> percentiles. These can be computed exactly in the same way as have computed the median. The only difference is  $1/4$ <sup>th</sup> of the  $N$  is counted off from the low end of the distribution to find  $Q_1$ , and  $3/4$ <sup>th</sup> of the  $N$  for  $Q_3$ . The formulas are as follows.

$$Q_1 = 1 + \left[ \frac{\frac{N}{4} - \text{Cum } f_1}{f_q} \right] i$$

$$Q_3 = 1 + \left[ \frac{\frac{3}{4} N - \text{Cum } f_1}{f_q} \right] i$$

#### Where:

1. The 1 is the exact lower limit of the class interval in which the respective quartile falls.
2.  $\frac{N}{4}$  and  $\frac{3}{4} N$  are the first and third quartiles.
3.  $\text{Cum } f_1$  – Cumulative frequency up to the class interval where the respective quartile point lies.
4.  $f_q$  – frequency of that class interval which contains the respective quartile.

5.  $i$  – size of the class interval.

### Worked Examples

Class Intervals (C.I.)	Frequency (f)	Cumulative Frequency (Cum f)
120-122	1	40
117-119	2	39
114-116	3	37
111-113	4	34
108-110	5	30
105-107	9	25
102-104	6	16
99-101	3	10
96-98	4	7
93-95	2	3
90-92	1	1
	<b>N = 40</b>	

We can compute **Q1** by using the formula,

$$Q_1 = 1 + \left[ \frac{\frac{N}{4} - \text{Cum } f_1}{f_q} \right] i$$

**Where**

$$\frac{N}{4} = \frac{40}{4} = 10$$

$$1 = 98.5, \text{Cum} f_1 = 7, f_q = 3, i = 3$$

Substituting the values in the formula, we get

$$Q_1 = 98.5 + \left[ \frac{10-7}{3} \right] 3 = 98.5 + 3 = 101.5$$

Now we can compute **Q3** in the same way,

Here, we first find out  $\frac{3}{4} N$

$$= \frac{3}{4} \times 40 = 30$$

i.e., **Q3** lies in the class interval 108 and 110.

$l = 107.5$  lower limit of the class interval, where  $Q_3$  lies.

$Cumf_1 = 25$  sum of the frequencies on all the class interval below  $Q_3$ .

$f_q = 5$  frequency of the class interval where  $Q_3$  lies.

$i = 3$  size of the class interval.

Substituting the values in the formula, we get

$$\begin{aligned} Q_3 &= 107.5 + \left[ \frac{30-25}{5} \right] 3 \\ &= 107.5 + \frac{5}{5} \times 3 \\ &= 110.5 \end{aligned}$$

Therefore,

$$\text{Quarter Deviation } Q = \frac{Q_3 - Q_1}{2}$$

**Where:**  $Q_1 = 101.5$ ,  $Q_3 = 110.5$

$$\begin{aligned} &= \frac{110.5 - 101.5}{4} \\ &= \frac{9}{2} = 4.5 \end{aligned}$$

### iii. Advantages of the Quarter Deviation:

- Can be used with ordinal as well as interval/ratio data.
- Can be found even if there are undeterminable or open-ended scores at either end of the distribution.
- Not affected by extreme scores or outliers.

### iv. Disadvantages of the Quarter Deviation:

- Does not take into account all the scores in the distribution.
- Does not play a role in advanced statistical procedures.

### 7.6.3 Range

Range is the simplest measure of variability. It is easy to understand and simple to compute. It is the difference between the highest and the lowest scores of the distribution. It is the most general measure of variability and it is computed when we wish to make a rough comparison of two or more groups for variability.

Range takes into account of the extremes of the series of the scores only and it is very unreliable measures of variability. Because it considers only the highest and lowest scores in the series and except these two score do not reveal anything about other scores in the series.

### **i. Worked Example**

Suppose an intelligent test has been administer to a group of 40 pupils say, in the group among the 40 series, highest score is 75 and the lowest score is say 40. Then,

$$\begin{aligned}\text{The Range} &= \text{Highest Score} - \text{Lowest Score} \\ &= 75 - 40 = 35\end{aligned}$$

Here it never speaks the rest 38 score in the series only the highest of 75 and the lowest of 40 we could able to explain in the data.

### **ii. Advantages of the Range**

- Easy to calculate.
- Can be used with ordinal as well as interval/ratio data.
- Encompasses entire distribution.

### **iii. Disadvantages of the Range**

- Depends on only two scores in the distribution and is therefore not reliable.
- Cannot be found if there are undeterminable or open-ended scores at either end of the distribution.
- Plays no role in advanced statistics.

## **7.6.4 Uses of Measures of Variability**

Measures of variabilities are used to know how the scores have been deviated in the distribution. It gives a better picture about the data how measures have been deviated from the central point in the given distribution. When we study the population in one or the more dimensions, the investigators like to determine an index that describes the variability more perfectly such an index is known as the measure of variability.

The range is used in knowing the highest and the lowest measures of the data.

Quarter deviation is more dependable measure of the range. It can be applied to most of the distribution including skewed distribution with unequal class intervals and also those whose top and bottom classes are open ended.

The Standard deviation has a close relationship with the normal probability curve if the distribution is normal about the 68.3 percent of the area under the curve falls within  $\pm 1 \sigma$  and about 95.4 percent of the area under the curve lies between  $\pm 2 \sigma$  and 99.7 percent of the area lies between  $\pm 3 \sigma$ . This is in fact is more useful in testing hypothesis. This measures of variability is used in calculation of correlation, in doing items analysis testing the item validity and reliability.

## **7.7 CORRELATION COEFFICIENT**

The coefficient of correlation is an index relationship between two or more variables and usually designated by 'r'. This coefficient ranges always between- 1 and +1. We have to take note of two important facts about the Correlation Coefficient the first one is the magnitude of the coefficient and the other is direction. If the variables are highly correlated the magnitude will be more and tends to one. When the relationship is perfect it becomes exactly one. When the coefficient is not one but very close to one, it indicates very high relationship and when the magnitude is low, more towards zero low relationship between the variables is indicated.  $r= 0$  indicates that the two variables are not at all related. So we can say that the magnitude of the Correlation Coefficient varies here between 0 and 1.

### **7.7.1 Rank Difference Correlation**

We do not have the actual scores of students on an examination, but we have only ranks or we are dealing with data which are heterogeneously distributed and the scores are not very meaningful in such situation, we have to determine the correlation coefficient between the given variables the best method is to apply the Spearman Ranks Difference Correlation Coefficient.

Condition:  $\rho$  (Rho)- Data is in ranks or capable of being ranked for both the variables X & Y.

#### **i. Calculation of Rank Difference Correlation**

The rank difference method of coefficient of correlation stated by Spearman can be calculated by the following formula.

$$\rho = 1 - \frac{6\sum D^2}{N(N^2-1)}$$

### Where

N = Number of pairs

P = Rank difference correlation coefficient

D = Difference between two ranks assigned to the individual

It is the best coefficient correlation especially when the number of cases is less than 30 and the data is in ranks or capable of being ranked.

### ii. Uses of Rank Difference Correlation

- This measure is especially useful when quantitative measures for certain factors cannot be fixed but the individuals in the group can be arranged in order.
- A knowledge of this is helpful in educational and vocational guidance, prognosis, in the selection of workers in office or factory and in educational decision making.

### Worked Examples

Compute coefficient of correlation for the following data by the rank difference method.

Student	Test 1	Test 2	R <sub>1</sub>	R <sub>2</sub>	D= R <sub>1</sub> - R <sub>2</sub>	D <sup>2</sup>
1	42	39	1	1	0.0	0.00
2	40	36	2	3	1.0	1.00
3	39	30	3	4	1.0	1.00
4	36	38	4	2	2.0	4.00
5	28	25	5	6	1.0	1.00
6	23	27	6	5	1.0	1.00
7	21	23	7.5	7.5	0.0	0.00
8	21	23	9.5	9.5	0.0	0.00
9	18	17	9	10	1.0	1.00
10	15	18	10	9	1.0	1.00
<b>N= 10</b>						<b>ΣD<sup>2</sup> = 10.00</b>

Where N= 10, ΣD<sup>2</sup>=10

Substituting the values in the formula, we get



$$\begin{aligned}
p &= 1 - \frac{6\Sigma D^2}{N(N^2-1)} \\
&= 1 - \frac{6 \times 10}{10(10^2-1)} \\
&= 1 - \frac{60}{(10 \times 99)} \\
&= 1 - 0.06 \\
P &= 0.94
\end{aligned}$$

**Steps:**

- Arrange the scores of the test scores from highest to the lowest.
- Change the serial number of the students according to this order.
- Rank the first score giving rank 1 to the highest score, rank 2 to the next highest score and so on. Enter these ranks  $R_1$ . If two students get the same score give them average rank. Rank the second test accordingly.
- Obtain the difference between the ranks test 1 & 2. Enter that as D.
- Square the difference D and designate it as  $D^2$ .
- Substitute the values in the formula.

This correlation coefficient is very high. Since the difference between 3 out of 10 ranks is zero and between 6 out of 10 is 1 which is very low.

### 7.7.2 Product Moment Correlation

Of the various correlation coefficients in current use, the one most frequently encountered is called the Pearson product moment correlation coefficient. The symbol of which is 'r'. The scores of the two variables are going to be correlated by means of the product moment correlation. Various techniques are employed to compute this measure. Some of them are,

1. Raw scores method (ungrouped data)
2. Method of deviations from the mean (ungrouped data)
3. Scatter Gram method (grouped data)

The methods of computing correlation coefficient discussed above two are applicable for ungrouped data. When the data are grouped we have to follow the method No.3 known as scatter gram method. Here we have large number of pairs of scores with suitable size of the class interval as we did in frequency distribution. Then we prepare a scatter gram in order to compute the correlation of coefficient for the grouped data by means of the following formula.

$$r = \frac{\frac{\sum x^1 y^1}{N} - C_x C_y}{\sigma_{x^1} \sigma_{y^1}}$$

**Where,**

$$C_x = \frac{\sum f x^1}{N}, C_y = \frac{\sum f y^1}{N}$$

$$\sigma_{x^1} = \sqrt{\frac{\sum f x^{1^2}}{N}} C^2 x \times i$$

$$\sigma_{y^1} = \sqrt{\frac{\sum f y^{1^2}}{N}} C^2 y \times i$$

### **i. Conditions**

1. Two continuous variables of X and Y are necessary i.e., both the variables are continuous.
2. Bivariate frequency distribution is to be prepared, referred as scattered diagram.

### **ii. Uses of Product Moment Correlation**

1. Much useful in finding about the reliability, testing the significance of the means of the groups and other psychological testing.
2. Most important uses of 'r' is in studying the predictive validity of the test. In this case scores on a test are correlated with criterion measure.
3. The prediction of 'r' the size of the correlation itself is not most important thing, but the situation in which it is being used is more important.
4. Further we will have a much role of 'r' in testing the significance. i.e., significance of person 'r'.

### **Check your Progress-2**

1. State the Measures of Variability.

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2. What is mean by Correlation Coefficient?

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3. List out the conditions of Product Moment Correlation Coefficient.

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## 7.8 GRAPHICAL REPRESENTATION OF DATA

Any data presented in the form of numbers and tables are not effective and do not create much interest in the reader. If the same data presented in graphs or charts will definitely attract the attention of the reader and makes the process more effective and very easy to follow, to understand and to remember. Apart from this the device attracts the attention of the reader.

Visual presentations impress more on the mind of a person and translate numerical values how they have been distributed in the data given.

Drawings are often called graphs. Graphs may be used effectively in understanding a group of test scores or other measures in the research process. Thus graphs are more effective, appealing than numerical data and tables.

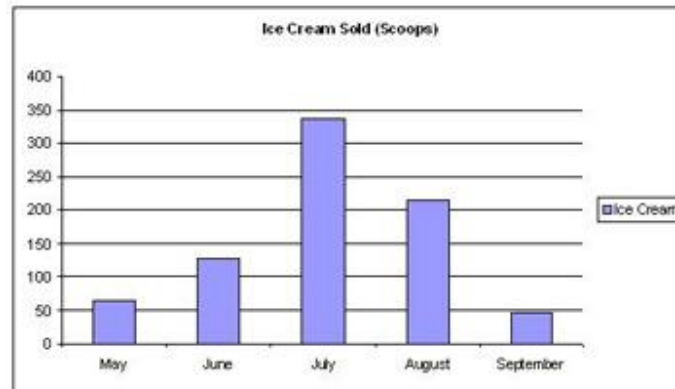
### 7.8.1 Bar- Diagram

A **bar diagram** is a chart that uses bars to show comparisons between categories of data. The bars can be either horizontal or vertical. Bar graphs with vertical bars are sometimes called vertical bar diagrams. A bar diagram will have two axes. One axis will describe the types of categories being compared, and the other will have numerical values that represent the values of the data. It does not matter which axis is which, but it will determine what bar diagram is shown. If the descriptions are on the horizontal axis, the bars will be oriented vertically, and if the values are along the horizontal axis, the bars will be oriented horizontally.

#### a. Types of Bar- Diagram

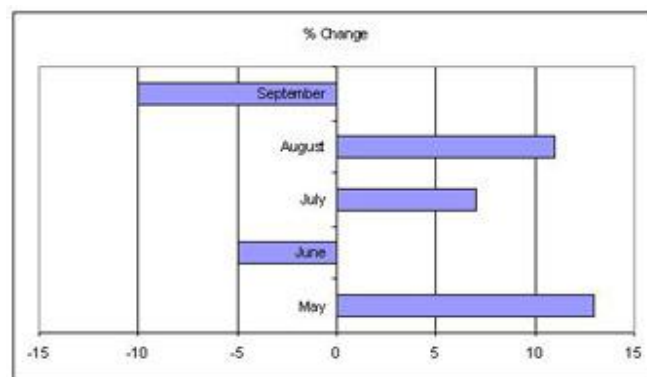
There are many different types of bar diagrams. They are not always interchangeable. Each type will work best with a different type of comparison. The comparison you want to make will help determine which type of bar diagram to use. First we'll discuss some **simple bar diagrams**.

A simple **vertical bar diagram** is best when you have to compare between two or more independent variables. Each variable will relate to a fixed value. The values are positive and therefore can be fixed to the horizontal value.



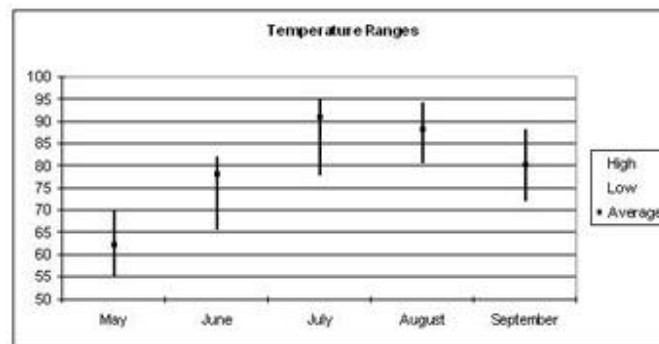
Vertical bar diagram

If your data has negative and positive values but is still a comparison between two or more fixed independent variables, it is best suited for a **horizontal bar diagram**. The vertical axis can be oriented in the middle of the horizontal axis, allowing for negative and positive values to be represented.



Horizontal bar diagram

A **range bar diagram** represents a range of data for each independent variable. Temperature ranges or price ranges are common sets of data for range diagrams. Unlike the above diagrams, the data do not start from a common zero point but begin at the low number for that particular point's range of data. A range bar diagram can be either horizontal or vertical.



Range bar diagram

The difference between a **histogram** and a simple bar graph is that in a histogram, each bar represents a range of dependent variables instead of just one data point.

### 7.8.2 Pie- Diagram

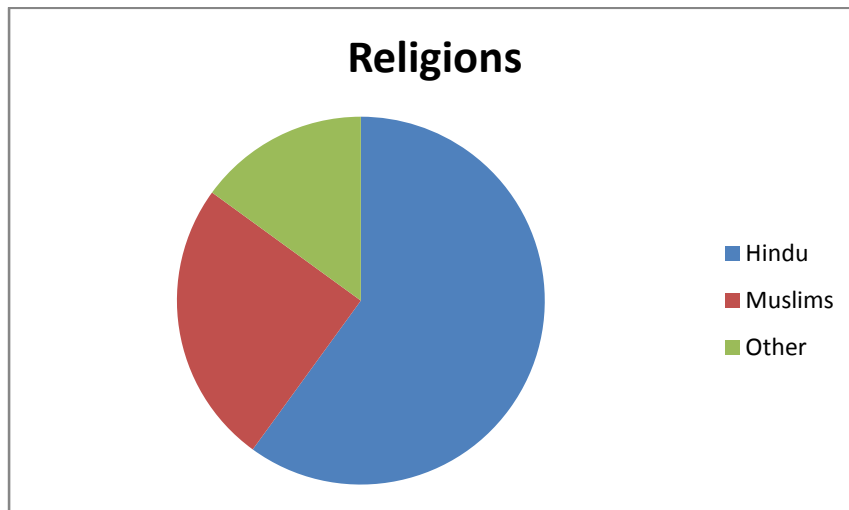
Pie- Diagram is otherwise called as sector graph or angular graph. It is called Pie-diagram because it resembles pie and with the help of a circle the data will be presented hence, also referred as circle graph or sector graph.

A circle may be sub-divided into sectors by subtending the angles at the centre of the circle. The given data is equated to 360 degrees. And each data is expressed in degrees. The sectors formed by the angle measured by the degrees of the data is proportional to the magnitude of the selected data.

#### ❖ Construction of Pie- Diagram

For the following data the Pie- diagram is constructed and represented by means of the given data. In a country out of the total population 60% are Hindus, 25% are Muslims and 15% are other religions say. We can construct a pie-diagram as following.

Since the total degree in a circle are 360 degree, 60% of 360 degree is equal to 216 degree. So by using protractor 216 degree are measured to represent the proportion of Hindus. After presenting this sector, the sector representing the proportion of Muslims should be marked. Muslim constitute 25%. So allotted to the other religions.



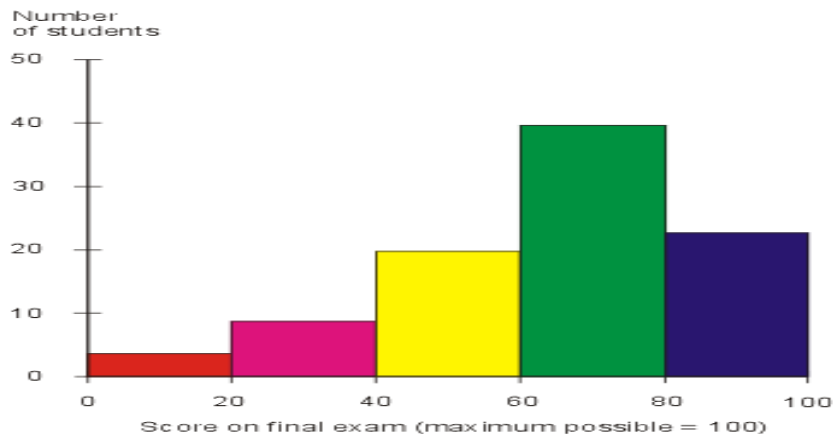
### 7.8.3 Histogram

Another way of presenting the data by means of a graph is Histogram. Histogram presents an accurate picture of the relative positions of the total frequency from one interval to the other interval. The frequencies within each interval of Histogram are presented by a rectangle, the base of which equals the length of the interval and height of which equals the numbers of the scores within a given interval are presented by the midpoint of the class interval. Whereas in as Histogram the scores are assumed to be spread uniformly over the entire interval, the area of each rectangle is directly proportional to number of measures in the interval. The other type of presenting the data is column diagram.

#### i. Construction of Histogram

The illustration, below, is a histogram showing the results of a final exam given to a hypothetical class of students. Each score range is denoted by a bar of a certain color. If this histogram were compared with those of classes from other years that received the same test from the same professor, conclusions might be drawn about intelligence changes among students over the years. Conclusions might also be drawn concerning the improvement or decline of the professor's teaching ability with the passage of time. If this histogram were compared with those of other classes in the same semester who had received the same final exam but who had taken

the course from different professors, one might draw conclusions about the relative competence of the professors.



Some histograms are presented with the independent variable along the vertical axis and the dependent variable along the horizontal axis. That format is less common than the one shown here.

## ii. Steps

- 1) Draw horizontal line at the bottom of a graph paper along which mark off units to represent the class intervals better to start with class interval of lowest value.
- 2) Draw a vertical line through the extreme end of the horizontal axis along which mark off units to represent the frequencies of the class intervals. Choose a scale which will make the largest frequency (the height of the y-axis) of the polygon approximately 75% of the width of the x-axis.
- 3) Draw rectangles with class units as base, such that the areas of rectangles are proportional to the frequencies of the corresponding class intervals.

## iii. Uses

Histogram is the most popular graph used to represent continuous frequency distribution. The width of the height of the rectangle are proportional to the length of the class intervals, the graph thus formed by a series of such rectangles adjacent to one another is called histogram. Thus the area of the histogram is proportional to the total number of frequencies spread on all the class intervals.

#### 7.8.4 FREQUENCY POLYGON

Polygon means many angled figure. In this graph various frequencies are being plotted with the corresponding class intervals. Thus the polygon is plotted from the scores by of a straight line. The procedure for plotting a frequency is as follows.

##### i. Steps

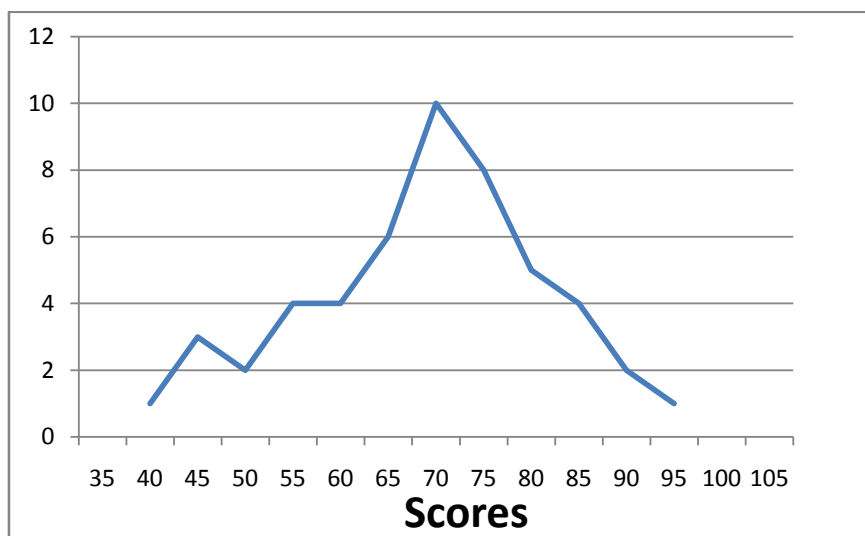
- 1) Draw two straight line perpendiculars to each other. The vertical line near the left side of the paper, the horizontal line near the bottom. Label the vertical line OY the y-axis and the horizontal line OX the x- axis. Put the O where the two lines intersect. This point is the origin.
- 2) Plot the class intervals of the frequency distribution at regular distance along the x- axis.
- 3) Mark on the y- axis the successive units to represent the scores on the different intervals. Select y- scale which will make the largest frequency of the Polygon approximately 75% of the width of the figure.
- 4) At the mid points plotted with straight lines so as to get the frequency Polygon graph.

##### ii. Construction of Frequency Polygon

Frequency Polygon can be plotted for the 50 achievement scores grouped into a frequency distribution.

Class Intervals	Mid Points	Frequency
95-99	97	1
90-94	92	2
85-89	87	4
80-84	82	5
75-79	77	8
70-74	72	10
65-69	67	6
60-64	62	4
55-59	57	4
50-54	52	2
45-49	47	3
40-44	42	1
		<b>N= 50</b>

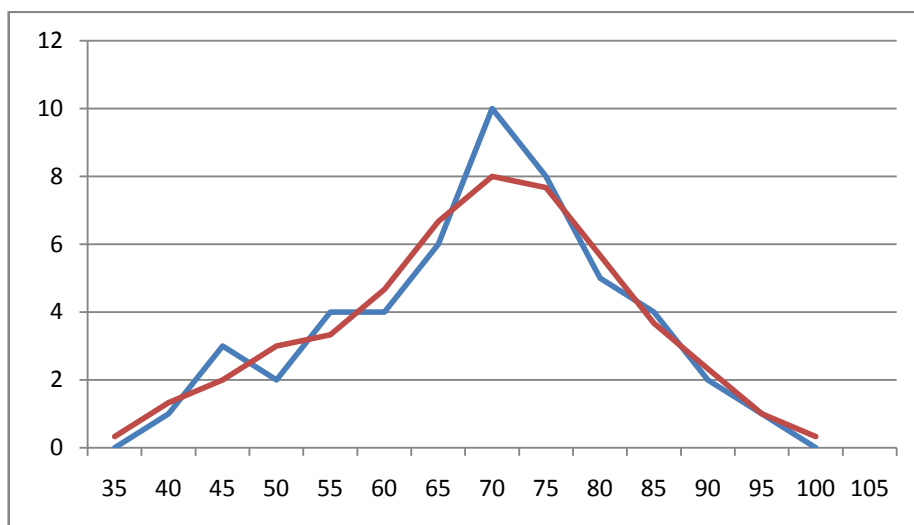




### iii. Smoothing the Frequency Polygon

As the sample is small the frequency Polygon is irregular, tends to be jagged in outline. To remove the irregularities and to get a better appearance of the graph, the frequency polygon may be “smoothened” as shown in the figure. To find out the smoothened  $f$ , we add the frequencies of the class interval with the frequencies on the two adjacent class intervals (i.e., the interval just below and the interval just above) and divide the sum by 3. For example, smoothened frequency of the class interval 45 and 49 is  $3+1+2= 6/3 = 2$ . In the same way for each class interval smoothened frequency will be calculated and the corresponding smoothened frequencies by plotting frequency polygon we get smoothened frequency polygon.

Class Intervals	Mid Points	Frequency	Smoothened f
100-104	102	0	0.33
95-99	97	1	1.00
90-94	92	2	2.33
85-89	87	4	3.67
80-84	82	5	5.67
75-79	77	8	7.67
70-74	72	10	8.00
65-69	67	6	6.67
60-64	62	4	4.67
55-59	57	4	3.33
50-54	52	2	3.00
45-49	47	3	2.00
40-44	42	1	1.33
35-39	37	0	0.33
		<b>N= 50</b>	



As smoothening gives a picture of what an investigator might have brought to his data, had been numerous, less subject to error that they work, one has to present the original frequency polygon along with smoothened frequency polygon. If N is large smoothening may not greatly change the shape of graph and hence it is often unnecessary.

#### iv. Uses

The frequency polygon is used in comparing two or more graphs plotted on the same axes, when the repeated scores of frequencies are there in the data the frequency polygon gives clear idea about the classified data. However it is less precise because it does not represented accurately the scores of the frequencies of the class interval but is more useful when the lines of graph are going to coincide each other.

#### 7.8.5 Cumulative Frequency Curve

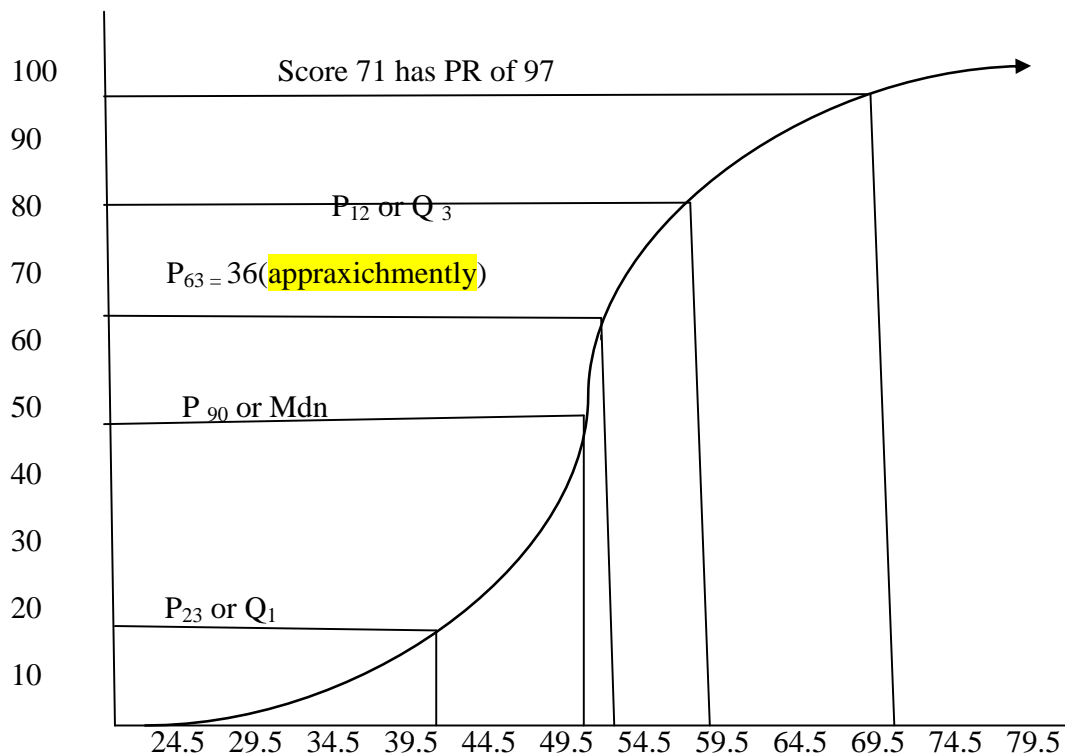
Cumulative Frequency Curve is called Ogive Curve. We convert the cumulative frequencies into cumulative percentage frequencies and then plotting the graph with the cumulative percentage frequencies corresponding to the class interval is what is called the ogive. This curve differs from the cumulative frequency graph. In that cumulative frequency graph frequencies are not graph to be expressed in the form of cumulative percents. Therefore in this graph the ogive the cumulative percents can be calculated by dividing each cumulative frequencies are going to be plotted. The conversion of cumulative frequencies into cumulative

percents can be calculated by dividing each cumulative frequency by N and multiplying by 100. The Cumulative Frequency Curve is drawn in the same manner as that of the frequency polygon.

### i. Construction of Cumulative Frequency Curve

Cumulative percentage curve can be plotted as below for the following frequency distribution.

Class Intervals	Frequency	Cum f	Cum. Percent f
74.5-79.5	1	125	100.0
69.5-74.5	3	124	99.2
64.5-69.5	6	121	96.8
59.5-64.5	12	115	92.0
54.5-59.5	20	103	82.4
49.5-54.5	36	83	66.4
44.5-49.5	20	47	37.6
39.5-54.5	15	27	21.6
34.5-39.5	6	12	9.6
29.5-34.5	4	6	4.8
24.5-29.5	2	2	1.6
	N = 125		



## ii. Steps

- Draw horizontal line at the bottom of a graph paper along which mark off units to represent the class interval.
- Draw a vertical line through the extreme end of the horizontal axis along which mark off the cumulative percentages corresponding to each class interval. Choose the scale again which will make the 75% width of the axis. Join the points and so as to get the ogive as shown in the figure.

## iii. Uses

1. Percentiles and percentile ranks may be determined quickly and accurately from the ogive when the curve is carefully drawn and the scale divisions are precisely marked.
2. A useful overall comparison of two or more groups is provided when Cumulative Frequency Curve representing their scores is plotted upon the same horizontal and vertical axis.
3. Percentile norms are determined directly from Cumulative Frequency Curve.

### **Check your Progress-3**

4. Explain the term Graphs.

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5. What do you mean by Histogram?

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6. Bring out the uses of Ogive Curve.

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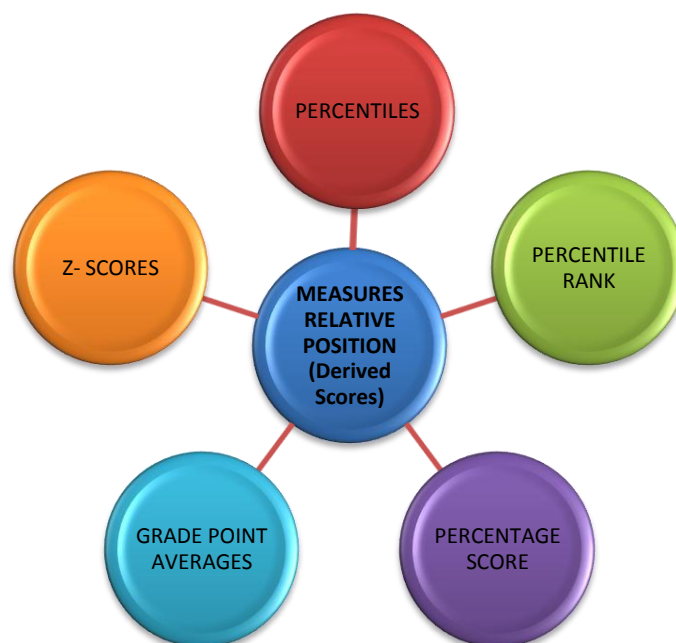
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## 7.9 MEASURES OF RELATIVE POSITION

Measures of relative position indicate where a score is in relation to all other scores in the distribution. In other words, measures of relative position permit you to express how well an individual has performed as compared to all other individuals in the sample who have been measured on the same variable. A major advantage is that they make it possible to compare the performance of an individual on two or more different tests.

### ➤ Types of Measures of Relative Position

A raw score on a test taken by itself has no value. It gets meaning only by comparing with some reference groups. The comparison is done with certain standard scores. Standard scores provide a method of expressing any score in a distribution in terms of its distance from the mean in standard deviation units. More frequently used relative positions are given below.



### 7.9.1 Percentiles

A **percentile** (or a centile) is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. For example, the 20th percentile is the value (or score) below which 20 percent of the observations may be found.

We have learned that the median is a point in a frequency distribution below which 50% of the scores and that  $Q_1$  and  $Q_3$  points below which 25% and 75% of the scores lie respectively. Using the same method by which, we may compute points below which 10%, 30%, 70%, 90% and etc., or any other percent of the scores. These points are called percentiles.

There are 99 percentiles for a frequency distribution. These percentiles, denoted by P1, P2, P3.....P99, divide the frequency distribution into 100 equal parts. In the between two consecutive percentiles, one percent of the value exists. Therefore percentile means in the frequency distribution, it is a point below which given percentages of the scores lie.

### ➤ Calculation Of Percentiles

The method of calculating the percentiles is the same as that of the techniques used in calculating the media. The formula is as follows.

$$P_p = l + \left[ \frac{pN - F}{f_p} \right] \times i$$

(Percentiles in a frequency distribution, counting from below up)

**Where,**

P = Percentage of the distribution wanted, e.g., 10%, 33%, etc.,

l = Exact lower limit of the class interval upon which  $P_p$  lie

pN = Part of N to be counted off in order to reach  $P_p$

F = Sum of all scores upon intervals below l

$f_p$  = Number of scores within the interval upon which  $P_p$  falls

i = Length of the class interval

### Worked Examples:

Compute percentiles for the following distribution

Class Intervals	Frequency	Cum. Frequency
70 – 80	9	120
60 – 70	32	111
50 – 60	43	79
40 – 50	21	36
30 – 40	11	15
20 – 30	3	4
10 – 20	1	1

Find the 60 percentile point.

60% of N 120 =  $60/100 \times 120 = 70$

60 percentage of the distribution wanted lie in the class interval 50 – 60.

$l = 50$  exact lower limit of the class interval upon which percentile point lies.

$F = 36$  sum of all the scores upon the intervals below  $l$ .

$f_p = 43$  frequency of the class interval where the given percentile point lies.

$i = 10$  Length of the class interval.

By applying the formula,

$$P_{60} = 50 + \left[ \frac{72-36}{43} \right] \times 10$$

$$P_{60} = 50 + 8.37 = 58.37$$

In the same manner we can calculate any percentile point like  $P_{10}$ ,  $P_{30}$ , .....  $P_{90}$  and etc., for the given frequency distribution.

### 7.9.2 Percentile Rank

The percentile rank of a given score is the percentage of scores falling below that score i.e., this is the percentage of scores which it exceeds. For example: if a 75% of the students in a distribution are below a particular student the percentile rank of that student is 75, i.e., he exceeds 75% of the students with whom he is compared.

A point on the raw score scale corresponding to a percentile rank is known as a percentile or in short a percentile. If a score of 70 on a test corresponds to the percentile of 40, then 70 is the 40<sup>th</sup> percentile. There are a total of 99 percentile which divide the frequency distribution into equal parts.

A percentile rank of pupil corresponding to a particular raw score is a number that indicate the percentage of pupils scoring below him.

#### ➤ Calculation of Percentile Rank

For computing the percentile rank of a given score in a frequency distribution, the following formula is found useful.

$$\text{Percentile Rank } P_R = \frac{i \times F + (\text{raw score} - 1)f}{i \times N} \times 100$$

➤ **Where,**

i = the length of the class interval

l = lower limit of the class interval containing the raw score

f = frequency of the class interval containing the raw score

F = the number of cases below the class interval containing the raw score

N = the total number of cases

➤ **Worked Examples**

Ex. 1: Distribution of 60 scores on mathematics test.

Class Intervals	Frequency
50 – 54	1
45 – 49	2
40 – 44	6
35 – 39	12
30 – 34	21
25 – 29	10
20 – 24	5
15 - 19	3
	N= 60

$$P_R \text{ of } 22 = \frac{(5 \times 3) + (22 - 19.5) \times 5}{5 \times 60} \times 100 = 5.83$$

The percentile rank of several scores can be read directly from the frequency distribution.



**Example 1:** Distribution of 100 scores on a grammar test.

Class Intervals	Frequency	Cum. Frequency
76 – 80	1	100
71 – 75	2	99
66 – 70	3	97
61 – 65	5	94
56 – 60	12	89
51 – 55	20	77
46 – 50	23	57
41 – 45	21	34
36 – 40	5	13
31 – 35	4	8
26 – 30	3	3
21 – 25	1	1
	N = 100	

$$PR = \frac{100}{N} \left[ Cumf + \frac{(X-L)}{I} \times f \right]$$

**Where,**

X = the score whose percentile rank is required

N = total number of frequencies

Cumf. = Cumulative frequency up to the class interval containing X.

L = lower limit of the class interval containing X.

f = frequency of the class interval containing X.

I = size of the class interval.

Percentile rank of the score 60 using this formula,

$$\begin{aligned}
 PR &= \frac{100}{100} 77 + \frac{60-55.5}{5} \times 12 \\
 &= 77 + \frac{4.5 \times 12}{5} \\
 &= 77 + 10.8 \\
 &= 87.8
 \end{aligned}$$

We can compute the percentile rank in ordered data by using the formula,

$$PR\ 60 = 100 - \frac{(100 R - 50)}{N}$$

The student whose rank is the highest are 1 has a percentile rank,

$$\begin{aligned} PR\ (1) &= 100 - \frac{(100 \times 1 - 50)}{10} \\ &= 100 - \frac{50}{10} \\ &= 100 - 5 = 95 \end{aligned}$$

(When there are 10 ranks in the distribution)

### 7.9.3 Percentage Score

It is often feasible to find the percentage of a given sample which exhibits a certain behaviour or characteristic. When it is impossible to measure these attributes directly given the percentage of occurrence of behaviour, the question often arises of how much confidence we can place in the figure. How reliable an index is our percentage of the incidence of the behaviour in which we are interested. To answer this question we must compute the percentage by the

equation  $\phi\ \% = \sqrt{\frac{PQ}{N}}$

#### ➤ Where

P- the percentage occurrence of the behaviour.

Q – (1-P)

N – Number of cases

#### ➤ Calculation of Percentage Score

In a study among elementary school children, 114 or 41.1% of the 348 children from homes of high socio-economic status were found to have cheated on various tests. Assuming our sample to be representative of children from good homes, how much confidence we place in this percentage? How well does it represent the population percentage?

$$\sigma \% = \sqrt{\frac{41.4\% \times 58.6\%}{348}} = 2.6\%$$

The sampling distribution of percentages can be taken as normal when N is large. When P is less than 95% and greater than 5%. The  $\sigma$  % is interpreted like the  $\sigma$  mean. In the present problem, 99 confidence interval further population percentage is 41.4%  $\pm$  2.58 x 2.6% or 34.7% to 48.1%. We may feel sure that the percentage of children is general who cheated on tests of the sort used in this study will be at least 34.7% and will not be larger than 48.1%.

#### 7.9.4 Grade Point Averages

Your grade point average (GPA) is calculated by dividing the total amount of grade points earned by the total amount of credit hours attempted. Your grade point average may range from 0.0 to a 4.0.

**For example:**

- A = 4.00 grade points
- A- = 3.70 grade points
- B+ = 3.33 grade points
- B = 3.00 grade points
- B- = 2.70 grade points
- C+ = 2.30 grade points
- C = 2.00 grade points
- C- = 1.70 grade points
- D+ = 1.30 grade points
- D = 1.00 grade points
- D- = 0.70 grade points
- WF/F=0 grade points

P/NP (Pass/No Pass) courses are not factored in the student's GPA. I (Incompletes) and W (Withdrawals) do not receive grade points and do not have an effect on the GPA.

➤ **Calculation of Grade Point Averages**

<b>Example Student Transcript</b>			
<b>Course</b>	<b>Credit Hours</b>	<b>Grade</b>	<b>Grade Points</b>
Biology	3	A	12
Biology Lab	1	B	3
English 101	3	C	6
Mathematics	3	F	0
<b>10 Total Credit Hours Attempted</b>			<b>21 Total Grade Points</b>

To get the example student's GPA, the total grade points are divided by the total credit hours attempted.

<b>Total Grade Points</b>		21	
	<u>divided by</u>	10	= 2.10
<b>Total Credit Hours Attempted</b>			

You can total your current semester courses and credits with our online GPA Calculator (above).

To calculate AP or Honors courses: When taking AP (advanced placement) or honors courses, grade points are generally weighted. For example, a half point (.50) is added for honors courses, and a whole point (1.0) is added for AP courses (A then equals 4.50 for an Honors class, or 5.00 for an Advanced Placement class). As schools may differ when assigning point value, contact your college for their grading system.)

To calculate your cumulative G.P.A., total the credit hours and then the grade points from all semesters. Divide the total grade points by the total credit hours. You can also use this online

tool. If you want to raise your GPA, an additional calculator helps you determine how many credit hours and what grade averages you will need to raise your current GPA.

### 7.9.5 Z- Scores

In describing a score in a distribution, its deviation from the mean- expressed in standard deviation units is often more meaningful than the score itself. The unit of measurement is the standard deviation. i.e.,

$$Z = \frac{X - \bar{X}}{\sigma}$$

➤ **Where,**

X- Raw score,  $\bar{X}$ - Mean,  $\sigma$  - Standard Deviation

➤ **Calculation of Z- Scores**

**Example 1:** Convert the raw score of 76 with a mean of 82,  $\sigma = 4$  into Z-score.

$$Z = \frac{76 - 82}{4} = \frac{-6}{4} = -1.50$$

The raw score – 76 may be expressed a score of -1.50, indicating that 76 is 1.5 standard deviations below the mean.

**Example 2:** Convert the raw score of 67 with a mean of 62,  $\sigma = 5$  into Z-score.

$$Z = \frac{67 - 62}{5} = \frac{5}{5} = 1.00$$

The raw score – 67 may be expressed as a Z score of 1.00, indicating that 67 is one standard deviation above the mean.

A Z- score makes possible a realistic comparison of score and provide a basis for equal weightage of the scores on the  $\sigma$  scale. The mean of any distribution is converted to zero. And the standard deviation is equal to 1.

## 7.10 FRAME OF REFERENCE FOR INTERPRETATION OF ASSESSMENT DATA

### 7.10.1 Norm-Referenced Test

Norm-referenced refers to standardized tests that are designed to compare and rank test takers in relation to one another. Norm-referenced tests report whether test takers performed better or worse than a hypothetical average student, which is determined by comparing scores

against the performance results of a statistically selected group of test takers, typically of the same age or grade level, who have already taken the exam.

Norm-referenced scores are generally reported as a percentage or percentile ranking. For example, a student who scores in the seventieth percentile performed as well or better than seventy percent of other test takers of the same age or grade level, and thirty percent of students performed better (as determined by Norming-group scores).

Norm-referenced tests often use a multiple-choice format, though some include open-ended, short-answer questions. They are usually based on some form of national standards, not locally determined standards or curricula. IQ tests are among the most well-known norm-referenced tests, as are developmental-screening tests, which are used to identify learning disabilities in young children or determine eligibility for special-education services.

#### **a. Used of Norm-Referenced Tests**

- To determine a young child's readiness for preschool or kindergarten. These tests may be designed to measure oral-language ability, visual-motor skills, and cognitive and social development.
- To evaluate basic reading, writing, and math skills. Test results may be used for a wide variety of purposes, such as measuring academic progress, making course assignments, determining readiness for grade promotion, or identifying the need for additional academic support.
- To identify specific learning disabilities, such as autism, dyslexia, or nonverbal learning disability, or to determine eligibility for special-education services.
- To make program-eligibility or college-admissions decisions (in these cases, norm-referenced scores are generally evaluated alongside other information about a student). Scores on SAT or ACT exams are a common example.

#### **b. Proponents of Norm-Referenced Tests**

- Norm-referenced tests can provide valuable information about student learning.
- The quality of norm-referenced tests are developed by testing experts, piloted and revised before they are used with students and they are dependable and stable for what they are designed to measure.

- Norm-referenced tests can help differentiate students and identify those who may have specific educational needs or deficits that require specialized assistance or learning environments.
- The tests are an objective evaluation method that can decrease bias or favoritism when making educational decisions.

### **7.10.2 Criterion-Referenced Test**

Criterion-referenced tests and assessments are designed to measure student performance against a fixed set of predetermined criteria or learning standards—i.e., concise, written descriptions of what students are expected to know and be able to do at a specific stage of their education. In elementary and secondary education, criterion-referenced tests are used to evaluate whether students have learned a specific body of knowledge or acquired a specific skill set.

If students perform at or above the established expectations—for example, by answering a certain percentage of questions correctly, they will pass the test, meet the expected standards, or be deemed “proficient.” On a criterion-referenced test, every student taking the exam could theoretically fail if they don’t meet the expected standard; alternatively, every student could earn the highest possible score. On criterion-referenced tests, it is not only possible, but desirable, for every student to pass the test or earn a perfect score. Criterion-referenced tests have been compared to driver’s-license exams, which require would-be drivers to achieve a minimum passing score to earn a license.

Criterion-referenced tests may include multiple-choice questions, true-false questions, “open-ended” questions (e.g., questions that ask students to write a short response or an essay), or a combination of question types. Individual teachers may design the tests for use in a specific course, or they may be created by teams of experts for large companies that have contracts with state departments of education.

Criterion-referenced tests may be high –stakes tests—i.e., tests that are used to make important decisions about students, educators, schools, or districts—or they may be “low-stakes tests” used to measure the academic achievement of individual students, identify learning problems, or inform instructional adjustments.

#### **a. Used of Criterion-Referenced Tests**

- To determine whether students have learned expected knowledge and skills. If the criterion-referenced tests are used to make decisions about grade promotion or diploma eligibility, they would be considered “high-stakes tests.”
- To determine if students have learning gaps or academic deficits that need to be addressed.
- To evaluate the effectiveness of a course, academic program, or learning experience by using “pre-tests” and “post-tests” to measure learning progress over the duration of the instructional period.
- To evaluate the effectiveness of teachers by factoring test results into job-performance evaluations
- To measure progress toward the goals and objectives described in an “individualized education plan” for students with disabilities.
- To determine if a student or teacher is qualified to receive a license or certificate.
- To measure the academic achievement of students in a given state, usually for the purposes of comparing academic performance among schools and districts.

#### **b. Proponents of Criterion-Referenced Testing:**

- The tests can use to improve teaching and school performance.
- The tests are evaluating achievement against a common and consistently applied set of criteria.
- The tests apply the same learning standards to all students, which can hold underprivileged or disadvantaged students to the same high expectations as other students.
- The tests can be constructed with open-ended questions and tasks that require students to use higher-level cognitive skills such as critical thinking, problem solving, reasoning, analysis, or interpretation.



### 7.10.3 Self-Reference

Self-reference occurs in natural or formal languages, when a sentence, idea or formula refers to itself. The reference may be expressed directly, through some intermediate sentence or formula or by means of some encoding. In Philosophy, it also refers to the ability of a subject to speak of or refer to itself: to have the kind of thought expressed by the first person nominative singular pronoun, the word-I in English.

Self-reference is studied and has applications in mathematics, Philosophy, Computer Programming and Linguistics. Self-referential statements are sometimes Paradoxical. In Computer Science, self-reference occurs in reflection, where a program can read or modify its own instructions like any other data. Numerous programming languages support reflection to some extent with varying degrees of expressiveness. Additionally, self-reference is seen in recursion (related to the mathematical recurrence relation), where a code structure refers back to itself during computation.

#### **Check your Progress-4**

7. Define Percentiles.

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8. Convert the raw score of 67 with a mean of 62.6 = 5 into Z-score.

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9. Give a note on 'Self-reference'.

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## 7.11 LET US SUM UP

So far you have learnt what are the raw scores and the frequency distribution. Before processing the raw score, it must be known that for what purpose the scores are being utilized. Based on the purpose, you have learnt where the Measures of Central Tendency that is Mean, Median and Mode and Measures of Variability such as Standard Deviation, Quartile Deviation and Range can be utilized. After the process of the data by using statistical techniques, you have learnt how the results can be highlighted through graphical representation like Line, Bar and Pie Diagrams, Histogram, Frequency Polygon and Cumulative Frequency Curve. You have also learnt how the percentiles, percentile rank, percentage score, grade point averages and z-scores can be derived and interpreted.

## 7.12 ANSWERS TO ‘CHECK YOUR PROGRESS’

1. The Measures of Central Tendency are Mean, Median and Mode.
2. The formula used to calculate Mean is  $M = \frac{\sum X}{N}$

Where,

M = Mean

$\sum$  = Sum of

X = Score in the distribution

N = Number of measures

3. The mode is 45 since it occurs most often.
4. The Measures of Variability are Standard Deviation, Quartile Deviation and Range.
5. The coefficient of correlation is an index relationship between two or more variables and usually designated by ‘r’. This coefficient ranges always between- 1 and +1.
6. i. Two continuous variables of X and Y are necessary i.e., both the variables are continuous. ii. Bivariate frequency distribution is to be prepared, referred as scattered diagram.
7. Drawings are often called graphs. Graphs may be used effectively in understanding a group of test scores other measures in the research process. Thus graphs are more effective, appealing than numerical than numerical data and tables.

8. The width of the height of the rectangle are proportional to the length of the class intervals, the graph thus formed by a series of such rectangles adjacent to one another is called histogram.
9. i. A useful overall comparison of two or more groups is provided when Cumulative Frequency Curve representing their scores is plotted upon the same horizontal and vertical axis. ii. Percentile norms are determined directly from Cumulative Frequency Curve.
10. A **percentile** (or a centile) is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. For example, the 20th percentile is the value (or score) below which 20 percent of the observations may be found.
11.  $Z = \frac{67-62}{5} = \frac{5}{5} = 1.00$   
The raw score – 67 may be expressed as a Z score of 1.00, indicating that 67 is one standard deviation above the mean.
12. Self-reference occurs in natural or formal languages, when a sentence, idea or formula refers to itself. The reference may be expressed directly, through some intermediate sentence or formula or by means of some encoding.

### 7.13 UNIT END EXERCISES

- Give the meaning of Measures of Central Tendency
- Explain Mean, Median and Mode in brief
- Describe the meaning of Measures of Variability
- Elaborate the Mean Deviation, Quartile Deviation and Standard Deviation,
- Bring out the uses of Measures of Variability, limitations and Interrelationship between Measures of Variability
- What is mean by Correlation Coefficient?
- Enumerate the different types of Correlation Coefficient
- Describe the different kinds of Graphical representation of Data
- Explain percentiles, percentile rank, percentage score, grade point averages and z-scores and its calculations
- What are norm-referenced, criterion-referenced and self-referenced tests?

#### **7.14 SUGGESTED READINGS**

- **Garret, H.E. (2008).** Statistics in Psychology and Education. Delhi: Surjeet Publications
- **Ramona Paetzold & Steven L. Willborn, (1994).** The Statistics of Discrimination: Using Statistical Evidence in Discrimination Cases.
- Panel on Statistical Assessments as Evidence in the Courts, National Research Council, The Evolving Role of Statistical Assessments as Evidence in the Courts (Stephen E. Fienberg ed., 1989).
- **David H. Kaye & Mikel Aickin eds., 1986.** Statistical Methods in Discrimination Litigation
- **Hans Zeisel & David Kaye, (1997).** Prove It with Figures: Empirical Methods in Law and Litigation
- **William H. Kruskal & Judith M. Tanur eds., (1978).** International Encyclopedia of Statistics